```
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* effective March 20, 2005.  A new display format, IDERL, is now    *
* available and contains the CA role and document type information. *
*                                                                 *
*******************************************************************

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FILE COVERS 1907 - 4 Oct 2005  VOL 143 ISS 15
FILE LAST UPDATED: 3 Oct 2005  (20051003/ED)
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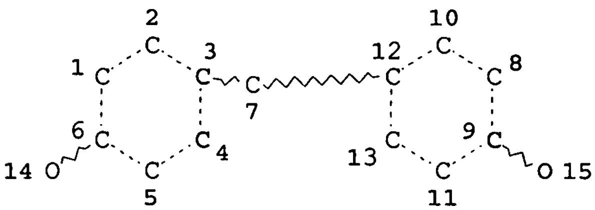
=> d que l10

L1 STR



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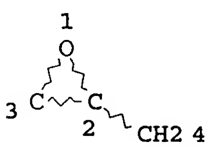
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RSPEC I
NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L2 STR



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GRAPH ATTRIBUTES:
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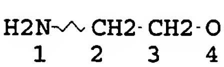
NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE

L3 STR



NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE

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L4              SCR 2043
L6          467 SEA FILE=REGISTRY SSS FUL L4 AND L1 AND L2 AND L3
L7           49 SEA FILE=HCAPLUS L6 AND (FOLIAT? OR EXFOLIAT? OR
                INTERCALAT? OR EXPAND(2A)LAYER?)
L8           73 SEA FILE=HCAPLUS L6 AND (?SILICATE? OR ?CLAY)
L9           41 SEA FILE=HCAPLUS L7 AND L8
L10          37 SEA FILE=HCAPLUS L9 AND NANO?
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=> d l10 bib abs ind hitstr 1-37

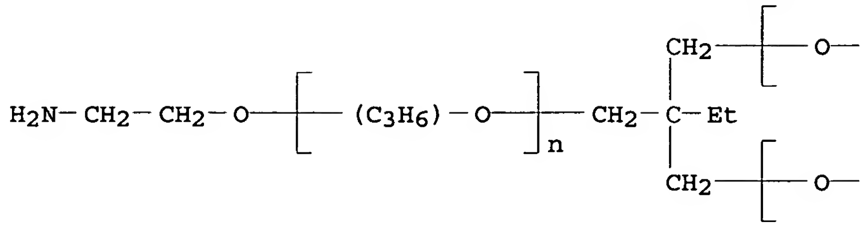
L10 ANSWER 1 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2005:369615 HCAPLUS
DN 143:60670
TI Fine dispersion and property differentiation of **nanoscale silicate** platelets and spheres in epoxy **nanocomposites** Applicants
AU Chu, Chien-Chia; Lin, Jiang-Jen; Shiu, Chang-Ru; Kwan, Chang-Chin
CS Department of Chemical Engineering, National Chung Hsing University, Taichung, Taiwan
SO Polymer Journal (Tokyo, Japan) (2005), 37(4), 239-245 Date is too new
CODEN: POLJB8; ISSN: 0032-3896
PB Society of Polymer Science, Japan
DT Journal
LA English
AB Silica spheres (with an averaged diam. of 10 nm) and **silicate** platelets (approx. 100 + 100 + 1 nm3 in dimension) were allowed to disperse in polyoxypropylene-triamine (400 g/mol mol. wt.), then cured with the epoxy resin diglycidyl ether of bisphenol-A (DGEBA). With 1-5 wt % loading of these inorg. **silicates**, the cured epoxies exhibited high hardness, transparency, and a low thermal expansion coeff. These **silicate** platelets also enhance the epoxy hardness from the pristine 2H to 4H while adding only 0.5 wt %. By comparison, if the spherical silica is used, a similar hardness can only be achieved by loading as high as 5 wt % of the silica. The high aspect-ratio and fine dispersion of the platelet **silicates** were found to be important factors in influencing the cured epoxy's properties. In addn., a TEM micrograph shows that the **silicate** platelets are well-dispersed and have a unique self-arranged lamellar orientation.
CC 37-6 (Plastics Manufacture and Processing)
ST epoxy montmorillonite **exfoliation** platelet sphere size **nanocomposite** morphol hardness
IT Thermal expansion
(coeff.; **nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT Polymer morphology
(fracture-surface; **nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT Polymer morphology
(lamellar; **nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT Clays, uses
RL: MOA (Modifier or additive use); USES (Uses)
(montmorillonitic; **nanoscale silicate**

platelets and spheres in epoxy **nanocomposites**)
IT Hardness (mechanical)
Hybrid organic-inorganic materials
Intercalation
Nanocomposites
Particle size
Transparency
(**nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT Fracture surface morphology
(polymeric; **nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT Polymer degradation
(thermal; **nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT 1318-93-0D, Montmorillonite, sodium-exchanged
RL: MOA (Modifier or additive use); USES (Uses)
(**nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT **111307-30-3**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
IT **111307-30-3**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**nanoscale silicate** platelets and spheres in epoxy **nanocomposites**)
RN 111307-30-3 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane and α-hydro-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3:1) (9CI) (CA INDEX NAME)

CM 1

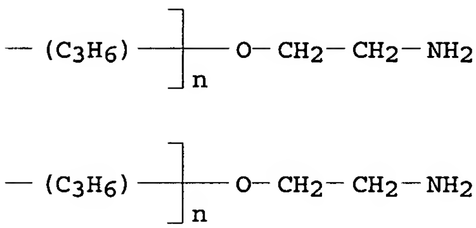
CRN 39423-51-3
CMF (C3 H6 O)n (C3 H6 O)n (C3 H6 O)n C15 H35 N3 O3
CCI IDS, PMS

PAGE 1-A



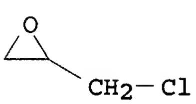
3 (D1—Me)

PAGE 1-B



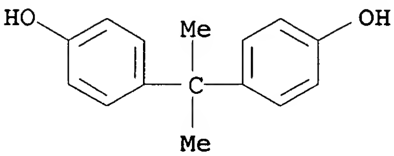
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 2 OF 37 HCAPLUS

Present & Application

AN 2005:325723 HCAPLUS
DN 142:374701
TI Method for producing **nanosilica** plates
IN Lin, Jiang-jen; Chu, Chien-chia
PA Taiwan
SO U.S. Pat. Appl. Publ., 10 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2005080180	A1	20050414	US 2003-685213	20031014

PRAI US 2003-685213 20031014

AB The invention relates to an **exfoliating** agent and to a process for producing random form of **nanoscale** silica plates for use in manuf. of **nanocomposites.** Two types of **exfoliating** agents are prepd. in the invention: AMO, which is prepd. by polymn. of p-cresol with HCHO and amine-terminated polypropylene glycol, amine-terminated polyethylene glycol, or amine-terminated ethylene oxide-propylene oxide copolymer, and AEO, which is prepd. by polymn. of the amine-terminated polyoxyalkylenes with bisphenol A epoxy resins. In the invention, layered **silicate** clays are **exfoliated** into random silica plates by acidifying AMO or AEO with inorg. acid, adding the acidified AMO or AEO to layered **silicate clay** with agitation, and adding sodium hydroxide or chloride of alkali metal or alk.-earth metal, in ethanol, water and a hydrophobic org. solvent to the intermediate product and repeating phase sepn. procedures to isolate random silica plates from water phase.

IC ICM C08K003-34
INCL 524445000
CC 37-6 (Plastics Manufacture and Processing)
ST **clay exfoliating** agent aminated polyoxyalkylene formaldehyde cresol copolymer manuf; bisphenol epoxy aminated polyoxyalkylene copolymer manuf **exfoliating** agent **clay**
IT **Exfoliation**
(agents; producing **nanosilica** plates by **exfoliating silicate** clays with polymers from amine-terminated polyoxyalkylenes)
IT Epoxy resins, preparation
RL: IMF (Industrial manufacture); NUU (Other use, unclassified); PREP (Preparation); USES (Uses)
(amino-contg., polyoxyalkylene-; producing **nanosilica** plates by **exfoliating silicate** clays with polymers from amine-terminated polyoxyalkylenes)
IT Polyoxyalkylenes, preparation
RL: IMF (Industrial manufacture); NUU (Other use, unclassified); PREP (Preparation); USES (Uses)
(epoxy, amino-contg.; producing **nanosilica** plates by

exfoliating silicate clays with polymers from
amine-terminated polyoxyalkylenes)

IT Polyoxyalkylenes, preparation
RL: IMF (Industrial manufacture); NUU (Other use, unclassified);
PREP (Preparation); USES (Uses)
(phenolic, amino-contg.; producing **nanosilica** plates by
exfoliating silicate clays with polymers from
amine-terminated polyoxyalkylenes)

IT Epoxy resins, preparation
Phenolic resins, preparation
RL: IMF (Industrial manufacture); NUU (Other use, unclassified);
PREP (Preparation); USES (Uses)
(polyoxyalkylene-, amino-contg.; producing **nanosilica**
plates by **exfoliating silicate** clays with
polymers from amine-terminated polyoxyalkylenes)

IT **Nanoparticles**
(producing **nanosilica** plates by **exfoliating**
silicate clays with polymers from amine-terminated
polyoxyalkylenes)

IT Kaolin, processes
Mica-group minerals, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical
process); PROC (Process)
(producing **nanosilica** plates by **exfoliating**
silicate clays with polymers from amine-terminated
polyoxyalkylenes)

IT **68318-44-5P**, Bisphenol A;epichlorohydrin;Jeffamine D-2000
copolymer 679427-02-2P, p-Cresol-Jeffamine D-2000-formaldehyde
copolymer
RL: IMF (Industrial manufacture); NUU (Other use, unclassified);
PREP (Preparation); USES (Uses)
(producing **nanosilica** plates by **exfoliating**
silicate clays with polymers from amine-terminated
polyoxyalkylenes)

IT 1318-93-0D, Montmorillonite, sodium-exchanged 14807-96-6, Talc,
processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical
process); PROC (Process)
(producing **nanosilica** plates by **exfoliating**
silicate clays with polymers from amine-terminated
polyoxyalkylenes)

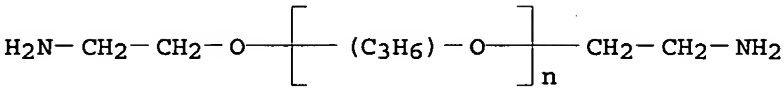
IT **68318-44-5P**, Bisphenol A;epichlorohydrin;Jeffamine D-2000
copolymer
RL: IMF (Industrial manufacture); NUU (Other use, unclassified);
PREP (Preparation); USES (Uses)
(producing **nanosilica** plates by **exfoliating**
silicate clays with polymers from amine-terminated
polyoxyalkylenes)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with
α-(2-aminomethylethyl)-ω-(2-
aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

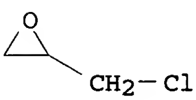
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

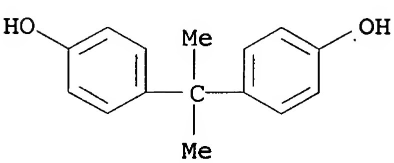
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



L10 ANSWER 3 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2004:815516 HCAPLUS
DN 142:23896
TI Adverse effects of thermal dissociation of alkyl ammonium ions on **nanoclay exfoliation** in epoxy-**clay** systems
AU Park, Jonghyun; Jana, Sadhan C.
CS Department of Polymer Engineering, College of Polymer Science and Polymer Engineering, University of Akron, Akron, OH, 44325-0301, USA
SO Polymer (2004), 45(22), 7673-7679 Date x
CODEN: POLMAG; ISSN: 0032-3861
PB Elsevier Ltd.
DT Journal
LA English
AB It has been shown recently that storage modulus of intra-gallery

epoxy plays a crucial role in producing **exfoliated clay** structures in epoxy-**nanoclay** systems. In this study, the possibility of thermal dissocn. of alkyl ammonium ions used as cation exchange agents of layered **silicate** clays and its effects on plasticization of epoxy networks and the growth of storage modulus of intra-gallery epoxy were investigated. At cure temps. higher than the dissocn. temp., primary amines were generated from the thermal dissocn. of alkyl ammonium ions and the excess chloride salt, which reacted readily with the epoxy mols. and formed linear chains. In addn., such reactions resulted in an excess of diamine curing agents, which in turn caused addnl. plasticization of epoxy networks and lowered the values of intra-gallery storage modulus. In such cases, only **intercalated** epoxy composites were produced.

CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38

ST storage modulus epoxy composite layered **silicate clay** alkylammonium dissocn

IT Elasticity
Nanocomposites
Storage modulus
Viscosity
(adverse effects of thermal dissocn. of alkyl ammonium ions on **nanoclay exfoliation** in and storage modulus of epoxy-**clay** systems)

IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(adverse effects of thermal dissocn. of alkyl ammonium ions on **nanoclay exfoliation** in and storage modulus of epoxy-**clay** systems)

IT 1318-93-0D, Montmorillonite ((Al1.33-1.67Mg0.33-0.67)(Ca0-1Na0-1)0.33Si4(OH)2O10.xH2O), sodium-exchanged
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(adverse effects of thermal dissocn. of alkyl ammonium ions on **nanoclay exfoliation** in and storage modulus of epoxy-**clay** systems)

IT 1602-97-7, Hexadecylammonium chloride
RL: NUU (Other use, unclassified); USES (Uses)
(adverse effects of thermal dissocn. of alkyl ammonium ions on **nanoclay exfoliation** in and storage modulus of epoxy-**clay** systems)

IT 61467-24-1 **110302-44-8**, Jeffamine D230-DGEBA copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(adverse effects of thermal dissocn. of alkyl ammonium ions on **nanoclay exfoliation** in and storage modulus of epoxy-**clay** systems)

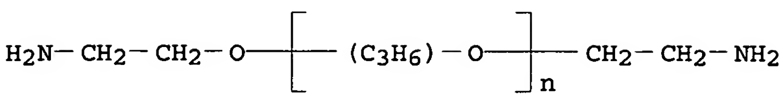
IT **110302-44-8**, Jeffamine D230-DGEBA copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(adverse effects of thermal dissocn. of alkyl ammonium ions on **nanoclay exfoliation** in and storage modulus of epoxy-**clay** systems)

RN 110302-44-8 HCAPLUS

CN Oxirane, 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] (9CI) (CA INDEX NAME)

CM 1

CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



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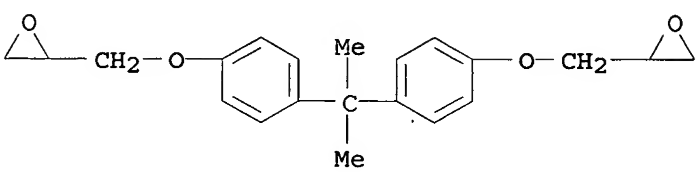
CM 2

CRN 1675-54-3
CMF C21 H24 O4



RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 4 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2004:434825 HCAPLUS
DN 141:124496
TI Layered **silicate**/epoxy **nanocomposites**: Synthesis, characterization and properties
AU Salahuddin, Nehal A.
CS Chemistry Department, Faculty of Science, Tanta University, Tanta, 31527, Egypt
SO Polymers for Advanced Technologies (2004), 15(5), 251-259
CODEN: PADTE5; ISSN: 1042-7147
PB John Wiley & Sons Ltd.
DT Journal
LA English

Date X

AB Novel epoxy-**clay nanocomposites** were prepd. by epoxy and organoclays. Polyoxypropylene triamine (Jeffamine T-403), primary polyethertriamine (Jeffamine T-5000) and three types of polyoxypropylene diamine (Jeffamine D-230, D-400, D-2000) with different mol. wt. were used to treat Na-montmorillonite (MMT) to form organoclays. The prepn. involves the ion exchange of Na+ in MMT with the org. ammonium group in Jeffamine compds. X-ray diffraction (X-ray diffraction) confirms the **intercalation**

of these org. moieties to form Jeffamine-MMT **intercalates.** Jeffamine D-230 was used as a swelling agent for the **organoclay** and curing agent. The d001 spacing of MMT in epoxy-**clay nanocomposites** depends on the **silicate** modification. Although X-ray diffraction data did not show any apparent order of the **clay** layers in the T5000-MMT/epoxy **nanocomposite**, TEM revealed the presence of multiplets with an av. size of 5 nm and the av. spacing between multiplets falls in the range of 100 Å. The multiplets clustered into mineral rich domains with an av. size of 140 nm. SEM reveals the absence of mineral aggregate. **Nanocomposites** exhibit significant increase in thermal stability in comparison to the original epoxy. The effect of the **organoclay** on the hardness and toughness properties of crosslinked polymer matrix was studied. The hardness of all the resulting materials was enhanced with the inclusion of **organoclay.** A three-fold increase in the energy required for breaking the test specimen was found for T5000-MMT/epoxy contg. 7 wt% of **organoclay** as compared to that of pure epoxy.

CC 37-6 (Plastics Manufacture and Processing)

ST prepn layered montmorillonite epoxy inclusion **nanocomposite** morphol hardness

IT Polyoxyalkylenes, preparation
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(epoxy; prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

IT Epoxy resins, preparation
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(polyoxyalkylene-; prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

IT Hardness (mechanical)
Polymer morphology
(prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

IT **Intercalation** compounds
RL: PRP (Properties)
(prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

IT **68318-44-5P**, DER 331-Jeffamine D 400 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(68318445; prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

IT 1318-93-0, Colloid BP, uses
RL: MOA (Modifier or additive use); USES (Uses)
(prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

IT **111307-30-3P**, DER 331-Jeffamine T 5000 copolymer
122673-79-4P, DER 331-Jeffamine T 403 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

IT **68318-44-5P**, DER 331-Jeffamine D 400 copolymer

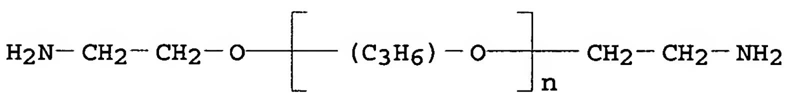
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(68318445; prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

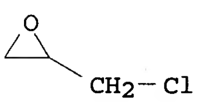
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

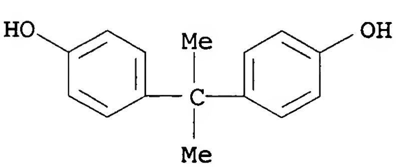
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



IT **111307-30-3P**, DER 331-Jeffamine T 5000 copolymer
122673-79-4P, DER 331-Jeffamine T 403 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(prepn., morphol., and hardness of layered montmorillonite/epoxy inclusion **nanocomposites**)

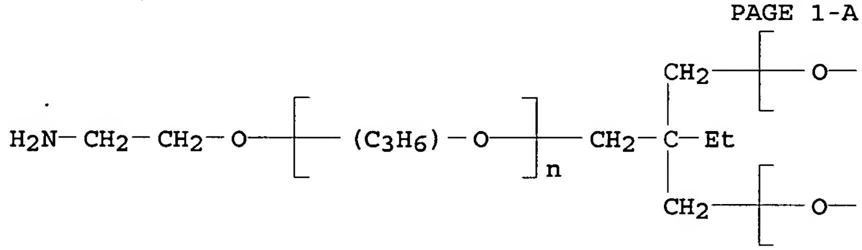
RN 111307-30-3 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane and α-hydro-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3:1) (9CI) (CA INDEX NAME)

CM 1

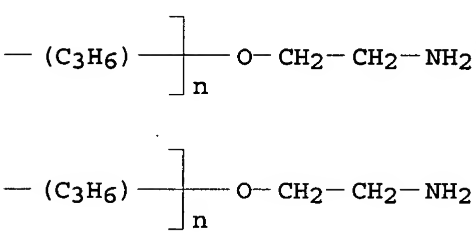
CRN 39423-51-3
CMF (C3 H6 O)n (C3 H6 O)n (C3 H6 O)n C15 H35 N3 O3
CCI IDS, PMS

PAGE 1-A



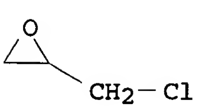
3 (D1—Me)

PAGE 1-B



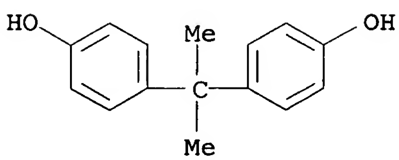
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2

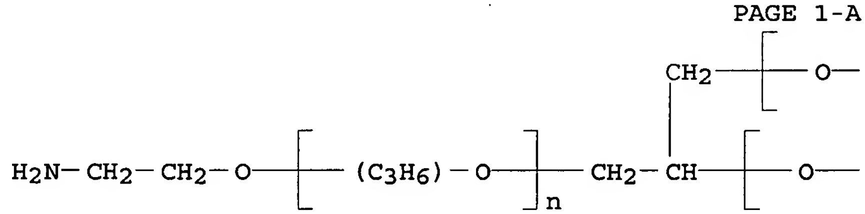


RN 122673-79-4 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane and α,α',α''-1,2,3-propanetriyltris[ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)]] (9CI) (CA INDEX NAME)

CM 1

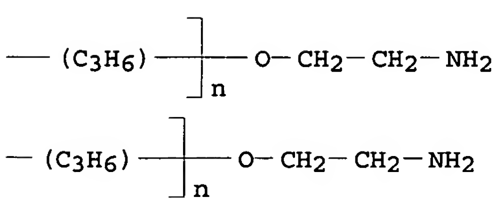
CRN 64852-22-8
CMF (C3 H6 O)n (C3 H6 O)n (C3 H6 O)n C12 H29 N3 O3
CCI IDS, PMS

PAGE 1-A



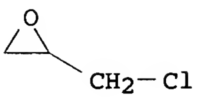
3 (D1—Me)

PAGE 1-B



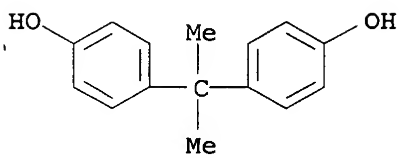
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 5 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2003:968909 HCAPLUS
DN 140:288892
TI Epoxy layered-**silicate nanocomposites**
AU Chen, Chenggang; Khobaib, Mohammad; Curliss, David
CS University of Dayton Research Institute, Dayton, OH, 45469-0168, USA
SO Progress in Organic Coatings (2003), 47(3-4), 376-383
CODEN: POGCAT; ISSN: 0300-9440
PB Elsevier Science B.V.
DT Journal
LA English
AB In this research, both com. available and synthesized organolayered **silicates**, which are compatible with the epoxy resins, were used to make epoxy **nanocomposites.** The epoxy resin used in this research includes Epon 862/curing agent W (the aerospace epoxy resin), the Epon 828/Epi-Cure curing agent 8290-Y-60 (used as the primer layer for corrosion prevention in aircraft coating), and Epon 828/Jeffamine D400. The morphol. of the **nanocomposites** was characterized using wide-angle x-ray diffraction (WAXD), small-angle x-ray scattering (SAXS) and TEM (TEM). The morphol. development for the aerospace epoxy-**organoclay nanocomposite** was monitored through in situ SAXS and analyzed. The solvent absorption of the **exfoliated** aerospace epoxy-**organoclay nanocomposite** in acetone was examd., and the diffusion coeffs. of solvent in the **nanocomposites** were reduced. The **organoclay**/Epon 828/Y-60 and **organoclay**/Epon 828/D400 **nanocomposite** were used to make coatings on an Al surface. The anticorrosion properties of the **nanocomposite** coating were evaluated and discussed.
CC 42-9 (Coatings, Inks, and Related Products)
Section cross-reference(s): 38

ST epoxy resin layered **silicate nanocomposite**
primer corrosion prevention
IT Polarization
(anticorrosion properties of cured epoxy layered-**silicate**
nanocomposite primers)
IT Primers (paints)
(anticorrosive; using epoxy layered-**silicate**
nanocomposite)
IT Coating process
(cast; for coating of aerospace materials with epoxy layered-
silicate nanocomposite primers)
IT Epoxy resins, uses
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(epoxy layered-**silicate nanocomposites** as
both aerospace materials and primer coating)
IT **Nanocomposites**
(in corrosion-preventive epoxy layered-**silicate**
nanocomposite as primer coating for aerospace materials)
IT **Silicates**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(layered; in corrosion-preventive epoxy layered-**silicate**
nanocomposite as primer coating for aerospace materials)
IT Clays, uses
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(montmorillonitic, C10-18 alkylammonium-modified; in
corrosion-preventive epoxy layered-**silicate**
nanocomposite as primer coating for aerospace materials)
IT Corrosion prevention
(of aerospace materials using epoxy layered-**silicate**
nanocomposite primers)
IT Surface structure
(of cured epoxy layered-**silicate nanocomposite**
primers)
IT 202817-71-8, Epicure W-Epon 862 copolymer
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(as aerospace materials using corrosion-preventive epoxy layered-
silicate nanocomposite primer coating)
IT 424829-07-2, 1.30E
RL: MOA (Modifier or additive use); USES (Uses)
(in corrosion-preventive epoxy layered-**silicate**
nanocomposite as primer coating for aerospace materials)
IT 1318-93-0, Cloisite Na+, uses
RL: MOA (Modifier or additive use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(in corrosion-preventive epoxy layered-**silicate**
nanocomposite as primer coating for aerospace materials)
IT **68318-44-5**, Epon 828-Jeffamine D 400 copolymer 675134-34-6
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(in corrosion-preventive epoxy layered-**silicate**

nanocomposite as primer coating for aerospace materials)

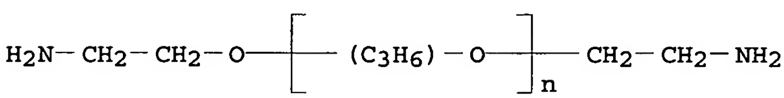
IT 68318-44-5, Epon 828-Jeffamine D 400 copolymer
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(in corrosion-preventive epoxy layered-**silicate** **nanocomposite** as primer coating for aerospace materials)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

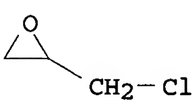
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

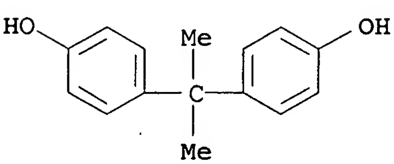
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 6 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2003:835915 HCAPLUS
DN 140:43014
TI Fracture behavior of core-shell rubber-modified **clay**-epoxy **nanocomposites**
AU Gam, K. T.; Miyamoto, M.; Nishimura, R.; Sue, H.-J.
CS Polymer Technology Center, Department of Mechanical Engineering, Texas A and M University, College Station, TX, 77843-3123, USA
SO Polymer Engineering and Science (2003), 43(10), 1635-1645
CODEN: PYESAZ; ISSN: 0032-3888
PB Society of Plastics Engineers
DT Journal
LA English
AB Morphol. and fracture mechanisms in two **nanoclay**-filled epoxy systems were investigated using both microscopy and spectroscopy tools. **Clay exfoliation** was achieved using a series of sample prepn. steps, and confirmed using wide angle X-ray diffraction (XRD) and transmission electron microscopy (TEM) techniques. Significant improvement in modulus was obtained when **clay exfoliation** was achieved. Incorporation of core-shell rubber (CSR) in both **clay** -filled epoxy systems leads to greatly enhanced fracture toughness. Optical microscopy and TEM observations of the CSR-modified **nanocomposites** suggest that CSR cavitation, shear yielding of the matrix, **clay** layer delamination, CSR bridging, crack bifurcation, and crack deflection are among the operative toughening mechanisms obsd., depending on the nature of the epoxy matrix utilized.
CC 37-5 (Plastics Manufacture and Processing)
Section cross-reference(s): 39
ST rubber **clay** epoxy **nanocomposite** morphol fracture
IT Rubber, properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(core-shell; fracture behavior of core-shell rubber-modified **clay**-epoxy **nanocomposites**)
IT **Nanocomposites**
(fracture behavior of core-shell rubber-modified **clay** -epoxy **nanocomposites**)
IT Epoxy resins, preparation
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(fracture behavior of core-shell rubber-modified **clay** -epoxy **nanocomposites**)
IT Crystal structure
(of **clay**-epoxy **nanocomposites**)
IT Flexural modulus
Fracture toughness
Glass transition temperature
Microstructure
Storage modulus
Stress-strain relationship
Young's modulus
(of **clay**-epoxy **nanocomposites** and core-shell rubber-modified **clay**-epoxy **nanocomposites**)

IT Complex modulus
 (tan δ; of **clay**-epoxy **nanocomposites** and core-shell rubber-modified **clay**-epoxy **nanocomposites**)

IT Stress, mechanical
 (yield; of **clay**-epoxy **nanocomposites** and core-shell rubber-modified **clay**-epoxy **nanocomposites**)

IT 1318-93-0, PGW, properties 309295-00-9, Cloisite 30B 424829-07-2, **Nanomer** I 30E
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
 (fracture behavior of core-shell rubber-modified **clay** -epoxy **nanocomposites**)

IT 85-44-9DP, Phthalic anhydride, cured with mixt. of bisphenol A diglycidyl ether and cylcoaliph. epoxy resin 1675-54-3DP, Bisphenol A diglycidyl ether, epoxy resin, mixed with cylcoaliph. epoxy, cured with phthalic anhydride **110302-44-8P**, DER 332-Jeffamine D400 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (fracture behavior of core-shell rubber-modified **clay** -epoxy **nanocomposites**)

IT **110302-44-8P**, DER 332-Jeffamine D400 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (fracture behavior of core-shell rubber-modified **clay** -epoxy **nanocomposites**)

RN 110302-44-8 HCAPLUS

CN Oxirane, 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] (9CI) (CA INDEX NAME)

CM 1

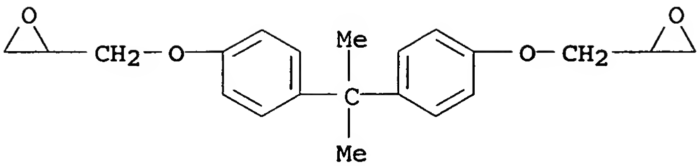
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS

$$H_2N-CH_2-CH_2-O-\left[(C_3H_6)-O\right]_n-CH_2-CH_2-NH_2$$

2 (D1—Me)

CM 2

CRN 1675-54-3
CMF C21 H24 O4



RE.CNT 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 7 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2003:790074 HCAPLUS
DN 140:17291
TI Effect of plasticization of epoxy networks by organic modifier on **exfoliation** of **nano clay**
AU Park, Jonghyun; Jana, Sadhan C.
CS Department of Polymer Engineering, College of Polymer Science and Polymer Engineering, University of Akron, Akron, OH, 44325-0301, USA
SO Macromolecules (2003), 36(22), 8391-8397
CODEN: MAMOBX; ISSN: 0024-9297
PB American Chemical Society
DT Journal
LA English
AB Plasticization of cross-linked epoxy networks by hydrocarbon chains of quaternary ammonium ions and its effect on **exfoliation** behavior of **nano clay** particles in mixts. of arom. and aliph. epoxides were investigated. It was found that quaternary ammonium ions, apart from catalyzing epoxy curing reactions, are capable of plasticizing cross-linked epoxy chains, the effect of which was obsd. in terms of large redn. in glass transition temp. and lowering of the values of storage modulus of cured epoxy networks. The effect of plasticization on storage modulus was found to be small for arom. epoxy and large for aliph. epoxy. As a consequence, the arom. epoxy-**clay** system produced complete **exfoliation** of **clay** galleries, while the systems with mixts. of aliph. and arom. epoxy resulted in **intercalated** systems, even though the extent of curing of epoxy was the same in all cases.
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 35
ST epoxy crosslinking kinetics **nanocomposite** montmorillonite quaternary ammonium plasticization **exfoliation**
IT Crosslinking kinetics
(effect of plasticization on crosslinking kinetics of epoxy networks)
IT Polyethers, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(epoxy; plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)
IT Polymer morphology
(micromorphol.; plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)
IT Clays, preparation

RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(montmorillonitic, fillers, **nanoparticles**; effect of plasticization on crosslinking kinetics of epoxy networks)

IT **Exfoliation**
Glass transition temperature
Loss modulus
Mechanical loss
Nanocomposites
Plasticization
Storage modulus
Viscosity
(plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

IT Epoxy resins, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

IT Polyethers, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

IT Quaternary ammonium compounds, preparation
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

IT Reinforced plastics
RL: PRP (Properties)
(plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

IT Epoxy resins, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(polyether-; plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

IT 1318-93-0DP, Cloisite Na+, cation exchange product with n-hexadecylamine hydrochloride 1602-97-7DP, n-Hexadecylamine hydrochloride, cation exchange product with Cloisite Na+
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(filler,**nano clay**; plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

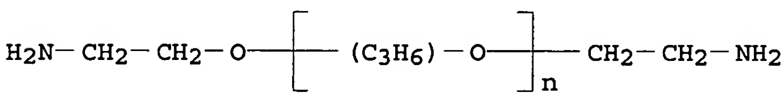
IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer 71745-12-5, Epon 828-HT 976 copolymer 200205-82-9 538370-85-3
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(plasticization of epoxy networks by org. modifier **exfoliation** of **nano clay**)

IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(plasticization of epoxy networks by org. modifier

exfoliation of nano clay)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

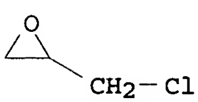
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

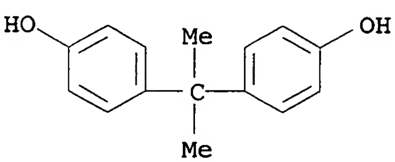
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

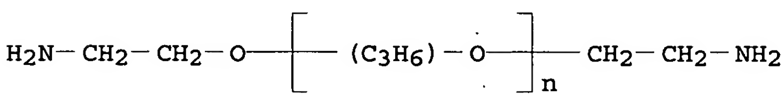
L10 ANSWER 8 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2003:731363 HCAPLUS
DN 140:236419
TI Mechanical and fracture properties of epoxy/inorganic micro- and

nano-composites
AU Kinloch, A. J.; Taylor, A. C.
CS South Kensington Campus, Department of Mechanical Engineering, Imperial College London, London, SW7 2AZ, UK
SO Journal of Materials Science Letters (2003), 22(20), 1439-1441
CODEN: JMSLD5; ISSN: 0261-8028
PB Kluwer Academic Publishers
DT Journal
LA English
AB AY 105 epoxy resin micro- and **nanocomposites** were prepd. using Jeffamine D230 amine hardener and a range of inorg. **silicate** modifiers, with **exfoliated**, **intercalated** and particulate morphologies being obtained. The modulus and fracture toughness of these composites increased with the wt. fraction of modifier. The fracture toughness was increased by up to 150% with the addn. of mica, with gave a classic microcomposite particulate material. However, when the epoxy was modified using Cloisite **clay silicates**, then generally only a relatively small toughening effect was obsd. and the fracture toughness of the **clay**-modified materials generally decreased as the degree of **exfoliation** of the **clay** particles increased. Overall, the mica-modified epoxy micro-composite showed the greatest increase in both stiffness and toughness compared with the unmodified thermosetting epoxy polymer. The moduli of both the micro- and **nanocomposites** agreed with predictions using the van-Es-modified Halpin-Tsai model.
CC 37-5 (Plastics Manufacture and Processing)
ST epoxy resin composite **clay** mica; montmorillonite epoxy resin composite fracture toughness; elastic modulus montmorillonite epoxy resin composite
IT Fracture toughness
Glass transition temperature
Young's modulus
(mech. and fracture properties of epoxy resin microcomposites and **nanocomposites** with unmodified and org. modified **silicates**)
IT Mica-group minerals, uses
RL: MOA (Modifier or additive use); USES (Uses)
(mech. and fracture properties of epoxy resin microcomposites and **nanocomposites** with unmodified and org. modified **silicates**)
IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(mech. and fracture properties of epoxy resin microcomposites and **nanocomposites** with unmodified and org. modified **silicates**)
IT 1318-93-0, Cloisite Na+, uses 292833-56-8, Cloisite 25A
309295-00-9, Cloisite 30B 424829-07-2, **Nanomer** I30E
RL: MOA (Modifier or additive use); USES (Uses)
(mech. and fracture properties of epoxy resin microcomposites and **nanocomposites** with unmodified and org. modified **silicates**)
IT **110302-44-8**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(mech. and fracture properties of epoxy resin microcomposites and **nanocomposites** with unmodified and org. modified

silicates)
IT **110302-44-8**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(mech. and fracture properties of epoxy resin microcomposites and **nanocomposites** with unmodified and org. modified **silicates**)
RN 110302-44-8 HCAPLUS
CN Oxirane, 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] (9CI) (CA INDEX NAME)

CM 1

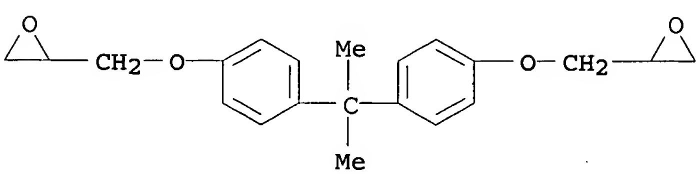
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1— Me)

CM 2

CRN 1675-54-3
CMF C21 H24 O4



RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 9 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2003:593175 HCAPLUS
DN 140:244055
TI **Exfoliated** graphite as a **nano**-reinforcement for polymers
AU Drzal, Lawrence T.; Fukushima, Hiroyuki
CS Composite Materials and Structures Center, Michigan State University, East Lansing, MI, 48824-1226, USA
SO International SAMPE Symposium and Exhibition (2003), 48(Advancing Materials in the Global Economy--Applications, Emerging Markets and

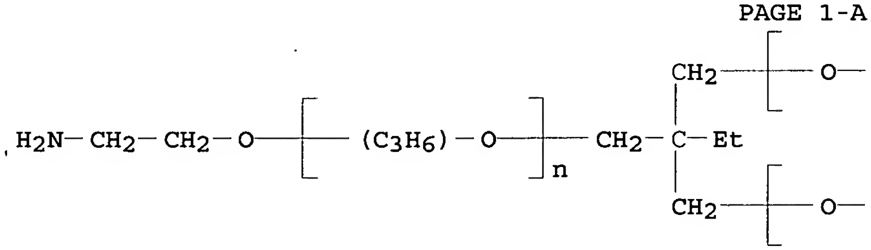
Evolving Technologies, Book 2), 1635-1642
CODEN: ISSEEG; ISSN: 0891-0138
PB Society for the Advancement of Material and Process Engineering
DT Journal
LA English
AB The mech. properties of an **exfoliated** graphite - epoxy (Epon 828-Jeffamine T403) composites were measured, including modulus, strength, coeff. of thermal expansion, and elec. and thermal properties. The results were compared with those of conventional **nanoclay**, vapor grown carbon fibers, and particulate graphite composites with epoxy resin. **Nanocomposite** materials made with **nanographite** platelets have three times the modulus of **nanoclay** platelet reinforced composites. With proper surface treatment of **nanographite**, a small decrease in tensile strength of composites was measured, compared to the neat matrix. Impedance measurements show that the platelets percolate at below 3 vol. percent and exhibit a .apprx.10 order of magnitude decrease in impedance. The **exfoliated** graphite composites are of interest for use as electromagnetic shielding.
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 38, 77
ST **exfoliated** graphite **nanocomposite** epoxy matrix tensile strength; cond percolation graphite **nanocomposite** epoxy thermal expansion
IT Epoxy resins, properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(binder; cond. percolation and thermal expansion and strength of **nanocomposites** based on **exfoliated** graphite with epoxy binder)
IT Electric impedance
Electromagnetic shields
Modulus (stress-strain)
Nanocomposites
Tensile strength
Thermal expansion
(cond. percolation and thermal expansion and strength of **nanocomposites** based on **exfoliated** graphite with epoxy binder)
IT Surface reaction
(oxidn. and amination; cond. percolation and thermal expansion and strength of **nanocomposites** based on **exfoliated** graphite with epoxy binder)
IT Electric conductivity
(percolation; cond. percolation and thermal expansion and strength of **nanocomposites** based on **exfoliated** graphite with epoxy binder)
IT **111307-30-3**, Epon 828-Jeffamine T403 copolymer
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(binder; cond. percolation and thermal expansion and strength of **nanocomposites** based on **exfoliated** graphite with epoxy binder)
IT 7782-42-5, Graphite, properties
RL: PRP (Properties); TEM (Technical or engineered material use);

USES (Uses)
(surface-treated, **exfoliated**; cond. percolation and thermal expansion and strength of **nanocomposites** based on **exfoliated** graphite with epoxy binder)
IT **111307-30-3**, Epon 828-Jeffamine T403 copolymer
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(binder; cond. percolation and thermal expansion and strength of **nanocomposites** based on **exfoliated** graphite with epoxy binder)
RN 111307-30-3 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane and α-hydro-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3:1) (9CI) (CA INDEX NAME)

CM 1

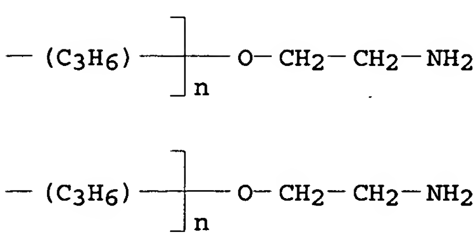
CRN 39423-51-3
CMF (C3 H6 O)n (C3 H6 O)n (C3 H6 O)n C15 H35 N3 O3
CCI IDS, PMS

PAGE 1-A



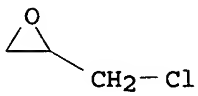
3 (D1—Me)

PAGE 1-B



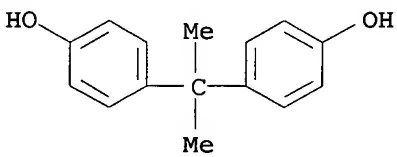
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 10 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:932153 HCAPLUS
DN 139:180933
TI The preparation of organo-kenyaite bonded by amine groups and its application as **nanocomposite**
AU Hwang, Yoon-Hyung; Jeong, Soon-Yong; Kong, Sung-Ho; Park, Kyeong-Won; Choi, Sang-Won; Kwon, Oh-Yun
CS Applied Chem. & Eng. Div., Korea Res. Inst. Chemical Technology, Daejeon, 305-600, S. Korea
SO Kongop Hwahak (2002), 13(7), 708-714
CODEN: KOHWE9; ISSN: 1225-0112
PB Korean Society of Industrial and Engineering Chemistry
DT Journal
LA Korean
AB Functional organo-kenyaite having interlayer surfaces chem. bonded with amine groups was prepd. by silylation of γ-aminopropyltriethoxysilane (APS) with interlayer Si-OH groups in the presence of gallery expander, dodecylamine (DDA), in ethanol. The **intercalation** and silylation were driven by entropy difference between the interlayer gallery and the outside, and the difference was due to the vaporization of ethanol from the slurry, composed of APS, DDA, H-kenyaite and ethanol. XRD anal. of dried organo-kenyaite revealed well-ordered large d-spacing of 4.14-5.12 nm. It was confirmed that the gallery height increased up to 2.3-3.3 nm. Solid-state 29Si MAS NMR peak showed that Q4/Q3 of organo-kenyaite increased substantially compared to Q4/Q3 of H-kenyaite, confirming successful silylation of APS with Si-OH groups in the interlayer surface. This process was performed at atm. condition without excess use of expensive reagent or effluent of waste liq. Polymer-**clay nanocomposite** was prepd. by mixing epoxy resin and organo-kenyaite. The properties of the **nanocomposite** were measured by TEM and SAXS. The

distance of the interlayer was expanded up to 5-6 nm. **Nanocomposite** was well **exfoliated** and dispersed by the extension of interlayer that was due to the **intercalation** of epoxy resin. The results offered a promising route to the prepn. of organo-layered kenyaite with various functional groups bonded chem. in the interlayer surface.

CC 38-2 (Plastics Fabrication and Uses)

ST amine group bonded organo kenyaite **nanocomposite** application

IT Silica gel, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(Wakogel Q 63, reactant in layered silica prepn.; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT Polyoxyalkylenes, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(epoxy; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT Silsesquioxanes
RL: MOA (Modifier or additive use); USES (Uses)
(layered **silicate** modified with; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT Materials
(layered, organo-modified; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT Polymer morphology
(microphase; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT Microstructure
(organo-kenyaites; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT Epoxy resins, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylene-; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT **Nanocomposites**
(prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT **Intercalation** compounds
RL: MOA (Modifier or additive use); USES (Uses)
(prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT 124-22-1, Dodecylamine
RL: MOA (Modifier or additive use); USES (Uses)
(gallery expander; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT 29159-37-3, γ-Aminopropyltriethoxysilane homopolymer
161376-90-5
RL: MOA (Modifier or additive use); USES (Uses)
(layered **silicate** modified with; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT 12285-95-9DP, Kenyaite, silane modified

RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT **68318-44-5**
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

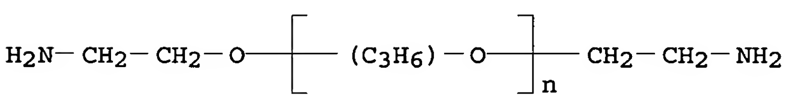
IT 497-19-8, Sodium carbonate, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(reactant in layered silica prepn.; prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

IT **68318-44-5**
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(prepn. of organo-kenyaites bonded by amine groups and their application as **nanocomposites**)

RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

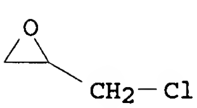
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1— Me)

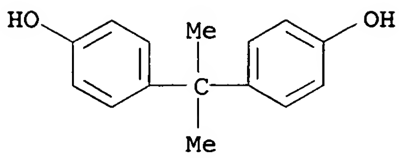
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



L10 ANSWER 11 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:805345 HCAPLUS
DN 138:304963
TI Polymerization compounding: Epoxy-montmorillonite **nanocomposites**
AU Feng, Wei; Ait-Kadi, Abdellatif; Riedl, Bernard
CS CERSIM/Departement de genie chimique Universite Laval, Quebec, G1K 7P4, Can.
SO Polymer Engineering and Science (2002), 42(9), 1827-1835
CODEN: PYESAZ; ISSN: 0032-3888
PB Society of Plastics Engineers
DT Journal
LA English
AB A strategy to design **intercalated** montmorillonite **nanocomposites** has been explored. A com. **organoclay**, 1.34 TCN (**Nanocor** Inc.), with bis(2-hydroxyethyl) Me tallow ammonium, was modified by toluene 2,4-diisocyanate (TDI) and bisphenol A (BA). Thermogravimetric anal. (TGA), FTIR spectroscopy and X-ray diffraction (XRD) results of unmodified and modified 1.34 TCN (1.34-TDI-BA) indicate that TDI and BA have reacted with hydroxyl groups on the surface of 1.34 TCN and hydroxyl groups in the interlayer of 1.34 TCN. Using a classical two-stage cure process with diamine as curing agent, **intercalated** epoxy **nanocomposites** were prepd. for both types of organoclays. XRD and TEM results showed that the basal spacing of **clay** in **nanocomposites** was 3.68 and 4.42 nm for 1.34 TCN and 1.34-TDI-BA, resp. Dynamic mech. anal. (DMA) was performed on both modified and unmodified **organoclay** composites. Modified **organoclay** composites were found to have enhanced storage moduli, particularly at temps. higher than the glass transition, Tg, of the matrix. Glass transition temps. extd. from linear viscoelastic data are found to be slightly higher for modified **organoclay nanocomposites**, indicating enhanced interactions between the modified **organoclay** and the epoxy matrix. These results were also confirmed by independent measurements of Tg using differential scanning calorimetry (DSC).
CC 37-6 (Plastics Manufacture and Processing)
ST TDI bisphenol modified montmorillonite epoxy **nanocomposite**; glass temp organo montmorillonite epoxy **nanocomposite**; storage modulus organo montmorillonite epoxy **nanocomposite**
IT Glass transition temperature
Mechanical loss
Nanocomposites
Polymer morphology

Storage modulus
Stress relaxation
(prepn. and properties of TDI- and bisphenol A-modified bis(hydroxyethyl)methyltallowammonium-montmorillonite-epoxy resin **nanocomposites**)

IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(prepn. and properties of TDI- and bisphenol A-modified bis(hydroxyethyl)methyltallowammonium-montmorillonite-epoxy resin **nanocomposites**)

IT 80-05-7D, Bisphenol A, reaction products with bis(hydroxyethyl)methyltallowammonium-modified montmorillonite and TDI 1318-93-0D, Montmorillonite, bis(hydroxyethyl)methyltallowammonium-modified, reaction products with TDI and bisphenol A 26471-62-5D, TDI, reaction products with bis(hydroxyethyl)methyltallowammonium-modified montmorillonite and bisphenol A 511244-55-6D, **Nanomer** I 34TCN, reaction products with TDI and bisphenol A
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(prepn. and properties of TDI- and bisphenol A-modified bis(hydroxyethyl)methyltallowammonium-montmorillonite-epoxy resin **nanocomposites**)

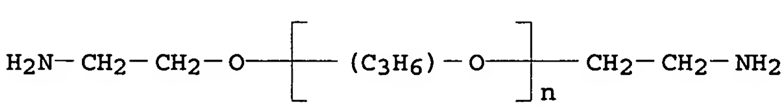
IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(prepn. and properties of TDI- and bisphenol A-modified bis(hydroxyethyl)methyltallowammonium-montmorillonite-epoxy resin **nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(prepn. and properties of TDI- and bisphenol A-modified bis(hydroxyethyl)methyltallowammonium-montmorillonite-epoxy resin **nanocomposites**)

RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

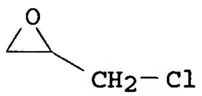
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

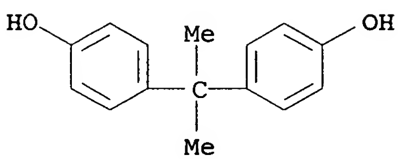
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

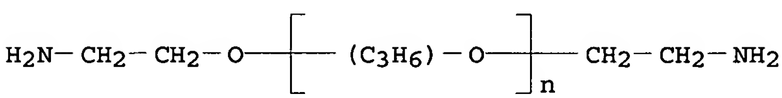
L10 ANSWER 12 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:779487 HCAPLUS
DN 138:56650
TI Synthesis of amine-cured, epoxy-layered **silicate nanocomposites**: the influence of the **silicate** surface modification on the properties
AU Kornmann, Xavier; Thomann, Ralph; Mulhaupt, Rolf; Finter, Jurgen; Berglund, Lars
CS Division of Polymer Engineering, Lulea University of Technology, Lulea, S-97187, Swed.
SO Journal of Applied Polymer Science (2002), 86(10), 2643-2652
CODEN: JAPNAB; ISSN: 0021-8995
PB John Wiley & Sons, Inc.
DT Journal
LA English
AB Fluorohectorites were rendered organophilic through the cation exchange of sodium intergallery cations for protonated monoamine, diamine, and triamine oligopropyleneoxides and octadecylamine, benzylamine, and adducts of octadecylamine and benzylamine with diglycidyl ether of bisphenol A (DGEBA). The influence of the **silicate** surface modification and compatibility on the morphol. and thermal and mech. properties was examd. Surface modification with protonated octadecylamine and its adduct with DGEBA promoted the formation of microscale domains of **silicate** layers sepd. by more than 50 Å, as evidenced by TEM and wide-angle x-ray scattering. Young's modulus of these two **nano**-composites increased parabolically with the true **silicate** content, whereas conventionally filled composites exhibited a linear relation. The highest fracture toughness was

obsd. for conventionally filled composites.
CC 37-3 (Plastics Manufacture and Processing)
ST amine cured epoxy layered **silicate nanocomposite** synthesis
IT Polyoxyalkylenes, preparation
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
(epoxy, **intercalating** agent; synthesis of epoxy-layered **silicate nanocomposites** using bisphenol A diglycidyl ether-amine adduct as surface modifier)
IT Polymer morphology
Tensile strength
Transmission electron microscopy
Young's modulus
(of epoxy-layered **silicate nanocomposites** using bisphenol A diglycidyl ether-amine adduct as surface modifier)
IT Epoxy resins, preparation
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
(polyoxyalkylene-, **intercalating** agent; synthesis of epoxy-layered **silicate nanocomposites** using bisphenol A diglycidyl ether-amine adduct as surface modifier)
IT **Nanocomposites**
(synthesis of epoxy-layered **silicate nanocomposites** using bisphenol A diglycidyl ether-amine adduct as surface modifier)
IT 100-46-9, Benzylamine, reactions 124-30-1, Octadecylamine 25085-99-8, Araldite MY 790-1
RL: RCT (Reactant); RACT (Reactant or reagent)
(in prepn. of bisphenol A diglycidyl ether-amine adduct for synthesis of epoxy-layered **silicate nanocomposites**)
IT **68318-44-5P**
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
(**intercalating** agent; synthesis of epoxy-layered **silicate nanocomposites**)
IT 182636-27-7, Somasif ME 100
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(ion exchange with bisphenol A diglycidyl ether-amine adduct, **intercalating** agent; prepn. of bisphenol A diglycidyl ether-amine adduct for synthesis of epoxy-layered **silicate nanocomposites**)
IT 479255-71-5P 479255-72-6P
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
(**silicate** surface modifier, ion exchange with Somasif ME 100 fir **intercalating**; prepn. of bisphenol A diglycidyl ether-amine adduct for synthesis of epoxy-layered

silicate nanocomposites)
IT 1343-98-2DP, Silicic acid, org. derivs.
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(synthesis of epoxy-layered **silicate nanocomposites** using bisphenol A diglycidyl ether-amine adduct as surface modifier)
IT **68318-44-5P**
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
(**intercalating** agent; synthesis of epoxy-layered **silicate nanocomposites**)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

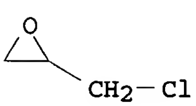
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

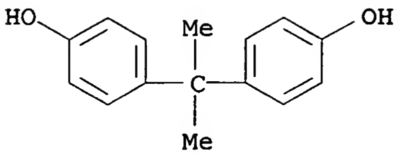
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 13 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:669864 HCAPLUS
DN 137:325949
TI Homostructured Mixed Inorganic-Organic Ion Clays: A New Approach to Epoxy Polymer-**Exfoliated Clay Nanocomposites** with a Reduced Organic Modifier Content
AU Triantafillidis, Costas S.; LeBaron, Peter C.; Pinnavaia, Thomas J.
CS Department of Chemistry, Michigan State University, East Lansing, MI, 48824, USA
SO Chemistry of Materials (2002), 14(10), 4088-4095
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English
AB A new approach to the prepn. of epoxy-**clay nanocomposites** is reported based on the **intercalation** and **exfoliation** of homostructured mixed inorg./org. cation exchanged forms of a com. available montmorillonite (PGW) and a synthetic fluorohectorite (FH) **clay.** In these mixed-ion homostructures both the org. onium ions and the inorg. exchange ions co-occupy the gallery surfaces of the **clay**, thereby dramatically reducing the amt. of org. modifier needed to access the galleries for **nanocomposite** formation. The homostructures were prepd. by ion exchanging the inorg. H+ and Li+ forms of the smectite clays with diprotonated primary α,ω-diamines of the type H2NCH(CH3)CH2[OCH2CH(CH3)]xNH2 (denoted Jeffamine D2000 with x = 33.1). Varying the ratio of inorg. cations to onium ions afforded homostructured mixed-ion **intercalates** with basal spacings ranging from .apprx.17 Å (25% onium ion exchange) to .apprx.46 Å (65% onium ion exchange), indicating the Jeffamine D2000 modifier adopted extended chain to folded chain configurations depending on loading. Thermoset glassy epoxy-**clay nanocomposites** were prepd. using EPON 826 resin and Jeffamine D-230 (x = 2.6) as a curing agent. Depending on the fraction of onium ions in the mixed-ion homostructures and on the method of **nanocomposite** prepn., **intercalated** and **exfoliated clay nanolayers** were achieved. The **intercalated** α,ω-diamine played the dual role of org. modifier of the **clay** and the curing agent in the thermoset epoxy matrix. Whereas the use of fully exchanged Jeffamine D2000 organoclays compromised the Tg of the matrix, mixed inorg.-org. ion **clay** homostructures made it possible to limit the plasticizing effect of the long-chain org. modifier and to preserve the glass transition temp. (Tg .apprx.

78-85 °C) while improving the storage modulus. Mixed inorg.-org. ion homostructured clays should also provide a useful approach to forming **nanocomposites** with other engineering polymers, while reducing the need for an org. **clay** surface modifier.

CC 37-3 (Plastics Manufacture and Processing)

ST epoxy resin **exfoliated** montmorillonite **nanocomposite**

IT Glass transition temperature
Loss modulus
Mechanical loss
Nanocomposites
Polymer morphology
Storage modulus
(of epoxy-montmorillonite **nanocomposites** based on **intercalation** and **exfoliation** of homostructured mixed inorg./org. cation exchanged forms)

IT Epoxy resins, preparation
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. of epoxy-montmorillonite **nanocomposites** based on **intercalation** and **exfoliation** of homostructured mixed inorg./org. cation exchanged forms)

IT 1318-93-0DP, Montmorillonite ((Al1.33-1.67Mg0.33-0.67)(Ca0-1Na0-1)0.33Si4(OH)2O10.xH2O), sodium-exchanged, reaction products with Jeffamine D2000 9046-10-0DP, Jeffamine D2000, reaction products with montmorillonite
RL: MOA (Modifier or additive use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. of epoxy-montmorillonite **nanocomposites** based on **intercalation** and **exfoliation** of homostructured mixed inorg./org. cation exchanged forms)

IT **68318-44-5P**, Epon 826-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. of epoxy-montmorillonite **nanocomposites** based on **intercalation** and **exfoliation** of homostructured mixed inorg./org. cation exchanged forms)

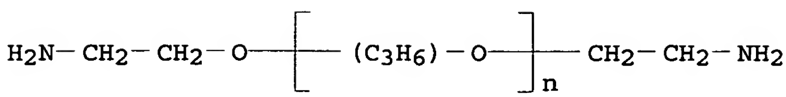
IT **68318-44-5P**, Epon 826-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. of epoxy-montmorillonite **nanocomposites** based on **intercalation** and **exfoliation** of homostructured mixed inorg./org. cation exchanged forms)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

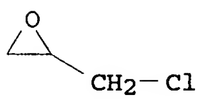
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

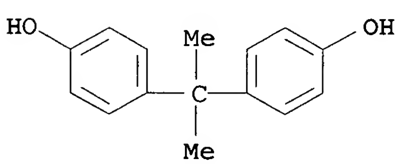
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 14 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:572891 HCAPLUS
DN 138:154272
TI Routes to and properties of **intercalated silicate nanocomposites**
AU Zerda, Adam S.; Caskey, Terrence C.; Lesser, Alan J.
CS Polymer Science and Engineering Department, University of Massachusetts, Amherst, MA, 01003, USA
SO Annual Technical Conference - Society of Plastics Engineers (2002), 60th(Vol. 2), 2256-2259
CODEN: ACPED4; ISSN: 0272-5223
PB Society of Plastics Engineers
DT Journal
LA English
AB Composites contg. 5-15% **clay** were made using Epon 825, Jeffamine D230 curing agent, and **Nanomer** I28E (organically modified **silicate**), and composites contg 25-50%

clay were made in a supercrit. CO2 chamber using Cloisite 20A (**silicates**), liq. Me methacrylate, and tert-Bu peroxybenzoate initiator. The composites with low **clay** concns. showed moderate increases in modulus, and large enhancement in fracture energy. The samples with the higher **clay** concns. were highly ordered and exhibited large increases in modulus.

CC 37-6 (Plastics Manufacture and Processing)

ST **nanocomposite silicate** epoxy resin mech property; PMMA **silicate nanocomposite** mech property

IT **Silicates**, properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(layered; morphol. and mech. properties of **nanocomposites** in relation to concn. of **intercalated silicates**)

IT Breaking strength
Fracture toughness
Nanocomposites
Polymer morphology
Young's modulus
(morphol. and mech. properties of **nanocomposites** in relation to concn. of **intercalated silicates**)

IT 296236-61-8, Cloisite 20A 373358-10-2, **Nanomer** 1.28E
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(morphol. and mech. properties of **nanocomposites** in relation to concn. of **intercalated silicates**)

IT 9011-14-7, PMMA
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(morphol. and mech. properties of **nanocomposites** in relation to concn. of **intercalated silicates**)

IT **68318-44-5P**, Bisphenol A-epichlorohydrin-Jeffamine D230 copolymer
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(morphol. and mech. properties of **nanocomposites** in relation to concn. of **intercalated silicates**)

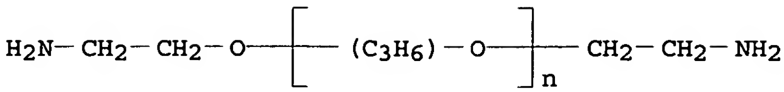
IT **68318-44-5P**, Bisphenol A-epichlorohydrin-Jeffamine D230 copolymer
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(morphol. and mech. properties of **nanocomposites** in relation to concn. of **intercalated silicates**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

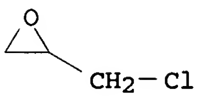
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1-Me)

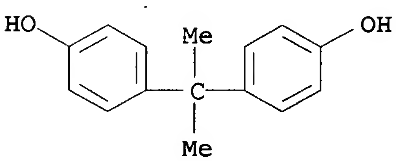
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 15 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:799460 HCAPLUS
DN 136:86578
TI Epoxy + montmorillonite **nanocomposite**: effect of composition on reaction kinetics
AU Butzloff, Peter; D'Souza, Nandika Anne; Golden, Teresa D.; Garrett, David
CS Department of Materials Science, University of North Texas, Denton, TX, 76203, USA
SO Polymer Engineering and Science (2001), 41(10), 1794-1802
CODEN: PYESAZ; ISSN: 0032-3888
PB Society of Plastics Engineers
DT Journal
LA English
AB The effect of montmorillonite layered **silicates** on the curing kinetics of the matrix epoxy resin was investigated. DSC was used to probe the changes in reactivity due to the presence of montmorillonite and the diamine hardener. The enthalpy of polymn.

was strongly affected in compns. contg. >5 wt% montmorillonite. XRD was used to characterize the **exfoliated** system. The results show a strong montmorillonite compn. dependence on the **exfoliated** state. TEM indicated a mixed **intercalated** and **exfoliated** dispersion in compns. contg. >2.5 wt% montmorillonite.

CC 37-6 (Plastics Manufacture and Processing)

ST epoxy montmorillonite **nanocomposite** curing kinetics

IT Crosslinking kinetics
(effect of montmorillonite content on curing kinetics in epoxy/montmorillonite **nanocomposites**)

IT Epoxy resins, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(effect of montmorillonite content on curing kinetics in epoxy/montmorillonite **nanocomposites**)

IT Polymer morphology
(effect of montmorillonite content on morphol. of epoxy/montmorillonite **nanocomposites**)

IT 1318-93-0, Montmorillonite, uses
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(effect of montmorillonite content on curing kinetics in epoxy/montmorillonite **nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(effect of montmorillonite content on curing kinetics in epoxy/montmorillonite **nanocomposites**)

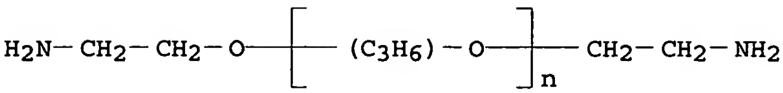
IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(effect of montmorillonite content on curing kinetics in epoxy/montmorillonite **nanocomposites**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

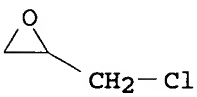
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

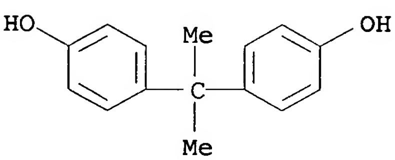
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 16 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:704068 HCAPLUS
DN 136:200862
TI **Nano**-sized fillers - advantages and disadvantages
AU Berglund, Lars
CS Division of Polymer Engineering, Lulea University of Technology, Lulea, Swed.
SO Fillers & Additives for Plastics 2000, Collected Papers of the International Conference, 4th, Copenhagen, Denmark, Oct. 25-26, 2000 (2000), 3.1-3.6. Editor(s): Skov, Hroar R. Publisher: Hexagon Holding ApS, Copenhagen, Den.
CODEN: 69BSQA
DT Conference; (computer optical disk)
LA English
AB The effect of the nature of the curing agent and curing conditions on the synthesis of **exfoliated** epoxy-**clay** **nanocomposites** was studied. The **clay** used in the

study was industrially purified and organically treated montmorillonite. The **exfoliation** of the organophilic **clay** in epoxy systems was controlled by a relative difference in reaction rates between the intra-gallery and extra-gallery polymn. The curing temp. controlled both the curing kinetics and the diffusion rate of the curing agent between the **clay** layers. The mol. mobility and the reactivity of the curing agent were important parameters, which influence the balance between the extra-gallery and the intra-gallery reaction rates. Measurements on two epoxy systems showed that the largest improvements in modulus with **clay** content were obtained for an epoxy resin cured with an aliph. curing agent with relatively low reactivity. The largest extent of **exfoliation** was obsd. in such epoxy system. The corresponding larger degree of **silicate** layer dispersion correlated with a higher modulus of the material.

CC 37-5 (Plastics Manufacture and Processing)

ST montmorillonite epoxy resin **exfoliated nanocomposite**

IT Crosslinking
  Nanocomposites
    (prepn. of org. modified montmorillonite-epoxy resin **exfoliated nanocomposites** with good mech. properties)

IT Epoxy resins, properties
  RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
    (prepn. of org. modified montmorillonite-epoxy resin **exfoliated nanocomposites** with good mech. properties)

IT 1318-93-0D, Montmorillonite, org. modified derivs. 320723-88-4, CWC ODA
  RL: MOA (Modifier or additive use); USES (Uses)
    (prepn. of org. modified montmorillonite-epoxy resin **exfoliated nanocomposites** with good mech. properties)

IT 38294-67-6, Amicure PACM-Epon 828 copolymer **68318-44-5**, Epon 828-Jeffamine D-230 copolymer
  RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
    (prepn. of org. modified montmorillonite-epoxy resin **exfoliated nanocomposites** with good mech. properties)

IT **68318-44-5**, Epon 828-Jeffamine D-230 copolymer
  RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
    (prepn. of org. modified montmorillonite-epoxy resin **exfoliated nanocomposites** with good mech. properties)

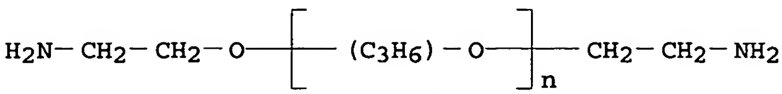
RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O

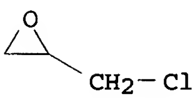
CCI IDS, PMS



2 (D1—Me)

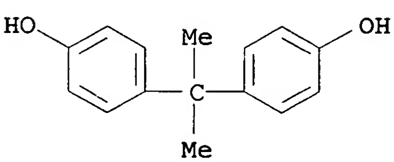
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 17 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:621802 HCAPLUS
DN 135:358753
TI **Intercalated clay nanocomposites**:
morphology, mechanics and fracture behavior
AU Zerda, Adam S.; Lesser, Alan J.
CS Polymer Science & Engineering Dept., University of Massachusetts, Amherst, MA, 01003, USA
SO Materials Research Society Symposium Proceedings (2001), 661(Filled and Nanocomposite Polymer Materials), KK7.2/1-KK7.2/6
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
AB **Intercalated nanocomposites** of modified

montmorillonite clays in a glassy epoxy were prepd. by crosslinking with com. available aliph. diamine curing agents. These materials are shown to have improved Young's modulus but corresponding redns. in ultimate strength and strain to failure. These results are consistent with most particulate filled systems. The macroscopic compressive behavior is unchanged, although the failure mechanism in compression varies from the unmodified samples. The fracture toughness of these materials is investigated and improvements in toughness values of 200% over unmodified resin are demonstrated. The fracture surface topol. is examd. and shown to be related to the **clay** morphol. of the system.

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 37, 57

ST epoxy diamine crosslinked **clay** montmorillonite **nanocomposite** fracture toughness morphol

IT Epoxy resins, uses
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(diamino-crosslinked; **intercalated clay nanocomposites**)

IT Polymer morphology
(fracture-surface; **intercalated clay nanocomposites**)

IT Brittle fracture
Fracture toughness
Nanocomposites
Stress-strain relationship
Tensile strength
Young's modulus
(**intercalated clay nanocomposites**)

IT **Clay** minerals
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**intercalated**; **intercalated clay nanocomposites**)

IT Clays, uses
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(montmorillonitic, **intercalated**; **intercalated clay nanocomposites**)

IT Fracture surface morphology
(polymeric; **intercalated clay nanocomposites**)

IT **68318-44-5**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**intercalated clay nanocomposites**)

IT 1318-93-0, Montmorillonite, uses 373358-10-2, **Nanomer** 1.28E
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**intercalated clay nanocomposites**)

IT **68318-44-5**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**intercalated clay nanocomposites**)

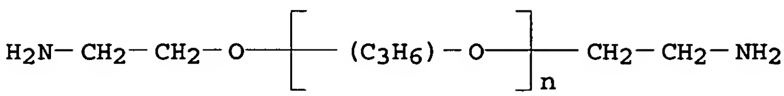
RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-

aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

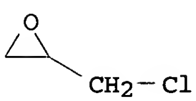
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

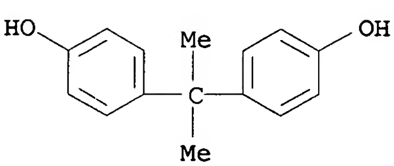
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

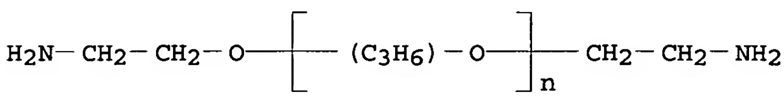
L10 ANSWER 18 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:354348 HCAPLUS
DN 135:108230
TI Stiffness improvements and molecular mobility in epoxy-**clay nanocomposites**
AU Kornmann, X.; Berglund, L. A.; Lindberg, H.
CS Division of Polymer Engineering, Lulea University of Technology, Lulea, S-97187, Swed.

SO Materials Research Society Symposium Proceedings (2001),
628(Organic/Inorganic Hybrid Materials), CC11.8.1-CC11.8.7
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
AB Conventional composites filled with **clay** as well as **intercalated nanocomposites**, and **exfoliated nanocomposites** based on a glassy epoxy matrix have been synthesized. Flexural moduli of these materials were measured in three-point bending at various **clay** contents. For a given **clay** content, stiffness improvements depended not only on the dispersion of the **clay** on the microscale, but also on the **exfoliation** of the **clay** layers at the **nanolevel.** Dynamic mech. measurements indicated a decrease of intensity in the glass transition peak with the extent of **exfoliation** of the **clay** and the **clay** content, suggesting a restriction of the mol. mobility of the polymer in the vicinity of the **clay** layers. A shift in Tg of 20°C towards lower temp. for the epoxy resin cured at 160°C was possibly caused by thermal degrdn. of compatibilizing agents at high temp.
CC 38-3 (Plastics Fabrication and Uses)
ST stiffness mol mobility epoxy **clay nanocomposite**
IT Bending
Exfoliation
Mechanical loss
Nanocomposites
Stiffness
(stiffness improvements and mol. mobility in epoxy-**clay nanocomposites**)
IT Epoxy resins, uses
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(stiffness improvements and mol. mobility in epoxy-**clay nanocomposites**)
IT 1318-93-0D, Montmorillonite, octadecylammonium chloride-modified
320723-88-4, CWC ODA
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(stiffness improvements and mol. mobility in epoxy-**clay nanocomposites**)
IT 1838-08-0D, Octadecylammonium chloride, reaction products with montmorillonite
RL: NUU (Other use, unclassified); USES (Uses)
(stiffness improvements and mol. mobility in epoxy-**clay nanocomposites**)
IT 38294-67-6, Epon 828-bis(p-aminocyclohexyl)methane copolymer
68318-44-5, Epon 828-Jeffamine D230 copolymer 116802-94-9
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(stiffness improvements and mol. mobility in epoxy-**clay nanocomposites**)
IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(stiffness improvements and mol. mobility in epoxy-**clay nanocomposites**)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with

α-(2-aminomethylethyl)-ω-(2-
aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

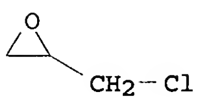
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

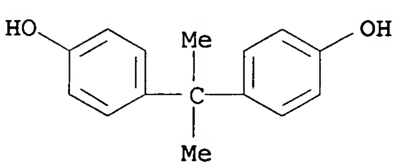
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

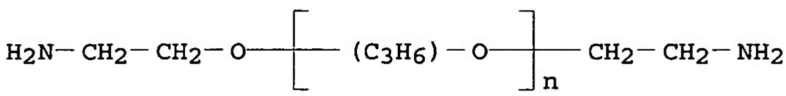
L10 ANSWER 19 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:343759 HCAPLUS
DN 135:93163
TI **Intercalated clay nanocomposites**:
morphology, mechanics, and fracture behavior
AU Zerda, Adam S.; Lesser, Alan J.
CS Polymer Science and Engineering Department, University of

Massachusetts, Amherst, MA, 01003, USA
SO Journal of Polymer Science, Part B: Polymer Physics (2001), 39(11), 1137-1146
CODEN: JPBPEM; ISSN: 0887-6266
PB John Wiley & Sons, Inc.
DT Journal
LA English
AB **Intercalated nanocomposites** of modified montmorillonite clays in a glassy epoxy were prepd. by crosslinking with com. available aliph. diamine curing agents. These materials are shown to have improved Young's modulus but corresponding redns. in ultimate strength and strain to failure. The results were consistent with most particulate-filled systems. The macroscopic compressive behavior was unchanged, although the failure mechanisms in compression varied from the unmodified samples. The fracture toughness of these materials was investigated and improvements in toughness values of 100% over unmodified resin were demonstrated. The fracture-surface topol. was examd. using scanning electron and tapping-mode at. force microscopies and shown to be related to the **clay** morphol. of the system.
CC 36-5 (Physical Properties of Synthetic High Polymers)
ST epoxy **clay intercalated nanocomposite**
morphol mechanics fracture
IT Compressive strength
Fracture (materials)
Nanocomposites
Polymer morphology
Tensile strength
Toughness
(morphol., mechanics, and fracture behavior of **intercalated clay nanocomposites**)
IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(morphol., mechanics, and fracture behavior of **intercalated clay nanocomposites**)
IT Clays, properties
RL: PRP (Properties)
(morphol., mechanics, and fracture behavior of **intercalated clay nanocomposites**)
IT 27578-18-3 **110302-44-8**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(morphol., mechanics, and fracture behavior of **intercalated clay nanocomposites**)
IT **110302-44-8**
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(morphol., mechanics, and fracture behavior of **intercalated clay nanocomposites**)
RN 110302-44-8 HCAPLUS
CN Oxirane, 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] (9CI) (CA INDEX NAME)

CM 1

CRN 9046-10-0

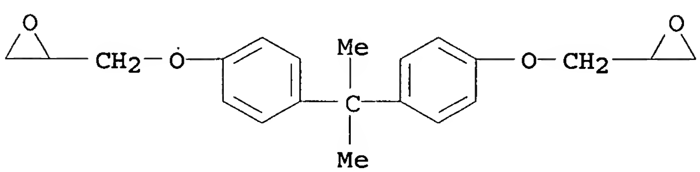
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

CM 2

CRN 1675-54-3
CMF C21 H24 O4



RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 20 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:118642 HCAPLUS
DN 134:341106
TI Synthesis of epoxy-**clay nanocomposites.** Influence of the nature of the curing agent on structure
AU Kornmann, X.; Lindberg, H.; Berglund, L. A.
CS Division of Polymer Engineering, Lulea University of Technology, Lulea, S-97187, Swed.
SO Polymer (2001), 42(10), 4493-4499
CODEN: POLMAG; ISSN: 0032-3861
PB Elsevier Science Ltd.
DT Journal
LA English
AB Epoxy-**clay nanocomposites** were synthesized by swelling an organophilic montmorillonite in a diglycidyl ether of bisphenol A resin with subsequent polymn. Three different curing agents were used: an aliph. diamine and two cycloaliph. diamines. The cure kinetics of these systems was evaluated by differential scanning calorimetry and the structure of the **nanocomposites** was characterized by X-ray diffraction and transmission electron microscopy. Successful **nanocomposite** synthesis was dependent not only on the cure kinetics of the epoxy system but also on the rate of diffusion of the curing agent into the galleries because it affects the intragallery cure kinetics. The nature of the curing agent influences these two phenomena substantially and

therefore the resulting structure of the **nanocomposite.**
The curing temp. controls the balance between the extragallery
reaction rate of the epoxy system and the diffusion rate of the
curing agent into the galleries. Thus, the choice of curing agent
and curing conditions controls the extent of **exfoliation**
of the **clay** in the material.

CC 37-6 (Plastics Manufacture and Processing)

ST bisphenolA diglycidyl ether diamine epoxy resin; **clay**
epoxy **nanocomposite** curing

IT **Exfoliation**
(degree of **exfoliation**; influence of curing agent on
structure of epoxy-**clay nanocomposites**)

IT **Nanocomposites**
(epoxy-**clay nanocomposites**; influence of
curing agent on structure of)

IT Crosslinking
Polymer morphology
Young's modulus
(influence of curing agent on structure of epoxy-**clay**
nanocomposites)

IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(influence of curing agent on structure of epoxy-**clay**
nanocomposites)

IT Solubility
(of curing agent on structure of epoxy-**clay**
nanocomposites)

IT Clays, uses
RL: MOA (Modifier or additive use); USES (Uses)
(organically treated montmorillonite; influence of curing agent
on structure of epoxy-**clay nanocomposites**)

IT 320723-88-4, CWC ODA
RL: MOA (Modifier or additive use); USES (Uses)
(influence of curing agent on structure of epoxy-**clay**
nanocomposites)

IT 38294-67-6, Amicure PACM-EPON 828 copolymer **68318-44-5**,
EPON 828-Jeffamine D-230 copolymer 116802-94-9
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(influence of curing agent on structure of epoxy-**clay**
nanocomposites)

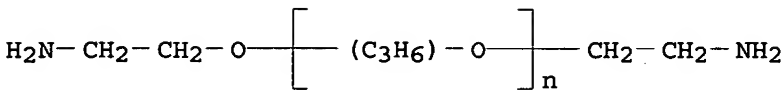
IT **68318-44-5**, EPON 828-Jeffamine D-230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(influence of curing agent on structure of epoxy-**clay**
nanocomposites)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with
α-(2-aminomethylethyl)-ω-(2-
aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

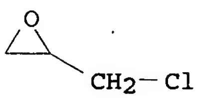
CRN 9046-10-0
CMF $(C_3H_6O)_n\ C_6H_{16}N_2O$
CCI IDS, PMS



2 (D1—Me)

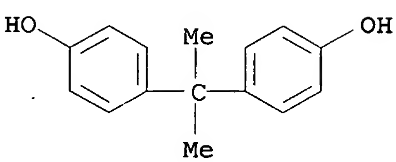
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 21 OF 37 HCAPLUS
AN 2000:763698 HCAPLUS
DN 134:132252
TI Synthesis of epoxy-**clay nanocomposites**: influence of the nature of the **clay** on structure
AU Kornmann, X.; Lindberg, H.; Berglund, L. A.
CS Division of Polymer Engineering, Lulea University of Technology, Lulea, S-97187, Swed.
SO Polymer (2000), Volume Date 2001, 42(4), 1303-1310
CODEN: POLMAG; ISSN: 0032-3861
PB Elsevier Science Ltd.
DT Journal
LA English
AB Epoxy-**clay nanocomposites** were synthesized using two montmorillonite clays (MMT) with different cation-exchange capacities (CEC) (94 and 140 meq/100 g). The purpose was to investigate the influence of the CEC of the **clay** on the

synthesis and structure of epoxy-**clay** **nanocomposites.** The dispersion of the 1 nm thick **clay** layers was investigated by X-ray diffraction (XRD) and transmission electron microscopy (TEM). Although XRD data did not show any apparent order of the **clay** layers in the **nanocomposite**, TEM revealed parallel **clay** layers with interlamellar spacing of 90 A (MMT of high CEC) and 110 A (MMT of lower CEC) and the presence of remnant multiplets of non-**exfoliated** layers. A mechanism responsible for the influence of CEC on **nanocomposite** interlamellar spacing is discussed. The dispersion of the **clay** was investigated by SEM and found to be finer in the **nanocomposites** as compared with in conventional composites although the **nanocomposites** still have **clay** aggregates at the microscale rather than a monolithic structure.

CC 37-6 (Plastics Manufacture and Processing)

ST epoxy **clay nanocomposite**

IT **Nanocomposites**
Polymer morphology
(epoxy-**clay nanocomposites**)

IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(epoxy-**clay nanocomposites**)

IT Clays, properties
RL: PRP (Properties)
(epoxy-**clay nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(epoxy-**clay nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(epoxy-**clay nanocomposites**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

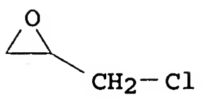
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS

$H_2N-CH_2-CH_2-O-[(C_3H_6)-O]_n-CH_2-CH_2-NH_2$

2 (D1—Me)

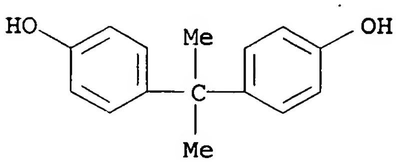
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 22 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:718484 HCAPLUS
DN 134:5474
TI Thermoset-Layered **Silicate Nanocomposites.** Quaternary Ammonium Montmorillonite with Primary Diamine Cured Epoxies
AU Brown, Janis M.; Curliss, David; Vaia, Richard A.
CS Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, 45433-7750, USA
SO Chemistry of Materials (2000), 12(11), 3376-3384
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English
AB The role of various quaternary ammonium-modified montmorillonites in epoxy/diamine **nanocomposite** formation was examd. to further refine the criteria for selection of org. modifiers necessary to enable fabrication of thermoset resins contg. **nanoscale** dispersions of inorg. phases. Utilization of a hydroxyl-substituted quaternary ammonium modifier affords flexibility to combine both catalytic functionality, which increases the intra-gallery reaction rate, with enhanced miscibility toward both reagents. The rheol. implications of these processing techniques are discussed with regards to using thermoset **nanocomposites** as a matrix in conventional fiber reinforced composites. The use of a low-boiling solvent to enhance mixing ability and processability of the initial mixts. is shown not to alter the structure or properties of the final **nanocomposite**. Also, the use of autoclave techniques enabled fabrication of

high-quality specimens contg. up to 20% organically modified layered **silicate** (OLS). **Exfoliated** and partially **exfoliated** epoxy/diamine **nanocomposites** were produced with enhanced heat-distortion temp. and increased flammability resistance.

CC 37-6 (Plastics Manufacture and Processing)

ST epoxy diamine **nanocomposite** ammonium modified montmorillonite thermoset; layered **silicate** **nanocomposite** dispersion epoxy resin miscibility; **exfoliated** epoxy diamine **nanocomposite** thermal stability flammability resistance

IT Quaternary ammonium compounds, properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(alkyl-tallow, montmorillonite-**intercalated**; prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT **Silicates**, properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(layered; prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT Polymer morphology
(phase; prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT Fire-resistant materials
Flexibility
Miscibility
Nanocomposites
Shear
Thermal stability
(prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT Epoxy resins, properties
RL: PRP (Properties)
(prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT Mechanical loss
(tan δ; prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT Plastics, properties
RL: PRP (Properties)
(thermosetting; prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT 1318-93-0D, Montmorillonite, quaternary ammonium modified
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D2000 copolymer
RL: PRP (Properties)
(prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D2000 copolymer
RL: PRP (Properties)

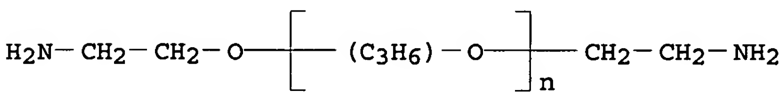
(prepn. and mech. properties of quaternary ammonium-modified montmorillonite diamine-epoxy **nanocomposites**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

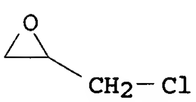
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

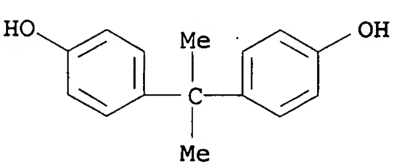
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 32 THERE ARE 32 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 23 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:590014 HCAPLUS
DN 133:178159

TI Acidified aqueous dispersions of high aspect ratio clays
IN Kaylo, Alan J.; Karabin, Richard F.; Lan, Tie; Sandala, Michael G.
PA PPG Industries Ohio, Inc., USA; Amcol International Corp.
SO U.S., 10 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6107387	A	20000822	US 1999-255205	19990222
	WO 2000048942	A1	20000824	WO 2000-US4464	20000222

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	AU 2000032395	A5	20000904	AU 2000-32395	20000222
PRAI	US 1999-255205	A	19990222		
	WO 2000-US4464	W	20000222		

AB Acidified aq. stable dispersions contain an **exfoliated silicate** derived from a **silicate** having a layer lattice structure in which the **silicate** layer units have a thickness 5-25Å, with the exchange capacity 30-200 mequiv/g **silicate** having a layer lattice structure, and where the **silicate** materials were **exfoliated** with a cationic group-contg. polymer or polymer having functional groups which can be post-reacted to form cationic groups. These **silicate** dispersions are useful in coating compns., particularly electrodepositable coating compns., where they impart improved crater control. Thus, a reaction mixt. of Der 732, bisphenol A, solvent, Jeffamine D-400, Epon 880, and catalyst was dispersed in water, showing Brookfield viscosity (spindle 3, 12 rpm) 5800 cSt, and mixed with water and PGV 5 to give a **nanocomposite** dispersion. An electrodeposition bath contg. cationic epoxy resin 694.8, the above **nanocomposite** dispersion 133.6, Butyl Carbitol formal 11.0, Microgel 41.3, Bu2SnO 13.3, and water 1596.8 parts was applied onto a cold rolled steel substrate, which had been pretreated with zinc phosphate pretreatment followed by a chrome rinse, and cured at 171.1° for 30 min to give a coated steel test panel having smoothness (10 = best, 0 = worst) 4-5, cratering count 5, and oil spot resistance 3-4; vs. 6-7 56, and 1; resp., without the **clay**.
IC ICM C08K003-36
INCL 524446000

CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 42
ST electrodeposition coating epoxy resin **clay**;
exfoliated silicate epoxy resin dispersion;
cationic epoxy resin electrodepositable **clay**;
nanocomposite dispersion electrodeposition coating;
montmorillonite **intercalate** epoxy resin dispersion
IT Kaolin, properties
RL: MOA (Modifier or additive use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(ASP 200; acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT Electrodeposits
Nanocomposites
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT Clays, properties
RL: MOA (Modifier or additive use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT Mica-group minerals, uses
Phyllosilicate minerals
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT Carboxylic acids, uses
RL: NUU (Other use, unclassified); USES (Uses)
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(cationic binder; acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT 1318-93-0, PGV 5, properties 14807-96-6, Talc, properties
RL: MOA (Modifier or additive use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT 25068-38-6, Epon 880 30401-87-7, Der 732
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT **282735-62-0**
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)
IT 50-21-5, uses 64-18-6, Formic acid, uses 64-19-7, Acetic acid, uses 144-62-7, Ethanedioic acid, uses 5329-14-6, Sulfamic acid
RL: NUU (Other use, unclassified); USES (Uses)

(for pretreatment to exchange interlayer cations; acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)

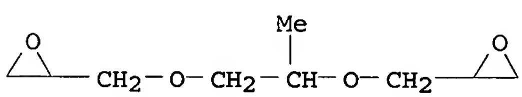
IT **282735-62-0**
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(acidified aq. dispersions of high aspect ratio **clay nanocomposite** with epoxy resin for coatings)

RN 282735-62-0 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)], (chloromethyl)oxirane and 2,2'-[(1-methyl-1,2-ethanediyl)bis(oxymethylene)]bis[oxirane] (9CI) (CA INDEX NAME)

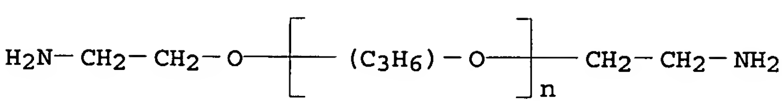
CM 1

CRN 16096-30-3
CMF C9 H16 O4



CM 2

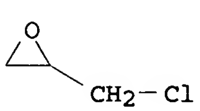
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

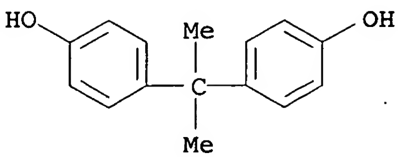
CM 3

CRN 106-89-8
CMF C3 H5 Cl O



CM 4

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 24 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:535211 HCAPLUS
DN 133:151412
TI Homostructured mixed organic and inorganic cation exchanged tapered compositions
IN Pinnavaia, Thomas J.; Shi, Heng-Zhen; Lan, Tie
PA Michigan State University, USA
SO PCT Int. Appl., 102 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000044825	A1	20000803	WO 1999-US2032	19990129
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	AU 9924868	A1	20000818	AU 1999-24868	19990129
	EP 1159345	A1	20011205	EP 1999-904475	19990129
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2003512276	T2	20030402	JP 2000-596074	19990129

PRAI WO 1999-US2032 A 19990129
AB Homostructured, cation exchanged, layered compns. contg. mixed onium

and alkali metal, alk. earth metal, protonated hydronium ions and mixts. thereof are described. Particulate concs. formed by **intercalation** of a polymer component into the galleries of the layered inorg. and org. homostructured layered cation exchange compn. and to the use of the particulate concs. for the prepn. of cured polymer-inorg. **nanolayer** hybrid composite compns. are described. In the most preferred embodiment of the invention the layered inorg. compn. is selected from the family of 2:1 layered **silicate** clays.

IC ICM C08K007-22

CC 37-6 (Plastics Manufacture and Processing)

ST layered **silicate** thermosetting resin **intercalate** **nanocomposite**

IT Hybrid organic-inorganic materials
  Intercalation
  Nanocomposites
    (homostructured mixed org. and inorg. cation exchanged tapered compns.)

IT Alkyd resins
Epoxy resins, preparation
Polyesters, preparation
Polyimides, preparation
Polysiloxanes, preparation
Polyureas
Polyurethanes, preparation
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
    (**intercalates** with layered **silicates**; homostructured mixed org. and inorg. cation exchanged tapered compns.)

IT **Silicates**, preparation
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
    (layered, **intercalated** with onium ions and inorg. ions; homostructured mixed org. and inorg. cation exchanged tapered compns.)

IT Plastics, preparation
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
    (thermosetting, **intercalates** with layered **silicates**; homostructured mixed org. and inorg. cation exchanged tapered compns.)

IT 112-02-7DP, **intercalation** complex with Hectabrite AW
1838-08-0DP, **intercalation** complex with Hectabrite AW
12173-47-6DP, Hectabrite AW, **intercalation** complex with quaternary alkylammonium chlorides **68318-44-5DP**, EPON-828 JEFFAMINE D2000 copolymer, **intercalates** with layered **silicates**
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
    (homostructured mixed org. and inorg. cation exchanged tapered compns.)

IT **68318-44-5DP**, EPON-828 JEFFAMINE D2000 copolymer, **intercalates** with layered **silicates**
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

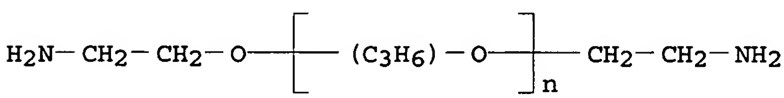
(homostructured mixed org. and inorg. cation exchanged tapered compns.)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

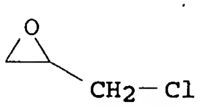
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

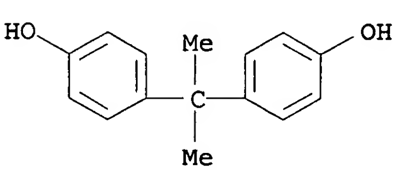
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

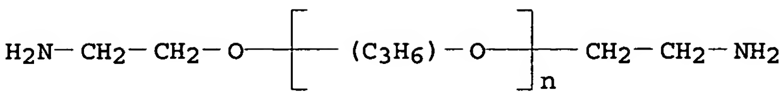
L10 ANSWER 25 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:182067 HCAPLUS
DN 132:294485

TI Processing and morphology in thermosetting layered **silicate** **nanocomposites**
AU Brown, Janis M.; Curliss, David B.; Vaia, Richard A.
CS Air Force Research Laboratory, Materials and Manufacturing Directorate, WPAFB, OH, 45433, USA
SO Polymeric Materials Science and Engineering (2000), 82, 278-279
CODEN: PMSEDG; ISSN: 0743-0515
PB American Chemical Society
DT Joúrnal
LA English
AB Combining new surface modifications, low boiling processing aids and autoclave processing, **exfoliated** and partially **exfoliated** epoxy resins contg. high loadings of layered **silicates** can be reproducibly fabricated with techniques compatible with polymer matrix composites. **Exfoliated** and partially **exfoliated** structures can be produced when a quaternary amine-modified layered **silicate** was combined with a primary amine cure epoxy.
CC 37-5 (Plastics Manufacture and Processing)
ST layered **silicate** epoxy resin **nanocomposite**; morphol processing **silicate** epoxy resin **nanocomposite**
IT **Silicates**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(layered; processing and morphol. of epoxy resin-layered **silicate** **nanocomposites**)
IT Glass transition temperature
Nanocomposites
Polymer morphology
(processing and morphol. of epoxy resin-layered **silicate** **nanocomposites**)
IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(processing and morphol. of epoxy resin-layered **silicate** **nanocomposites**)
IT **68318-44-5**
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(processing and morphol. of epoxy resin-layered **silicate** **nanocomposites**)
IT **68318-44-5**
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(processing and morphol. of epoxy resin-layered **silicate** **nanocomposites**)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O

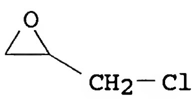
CCI IDS, PMS



2 (D1—Me)

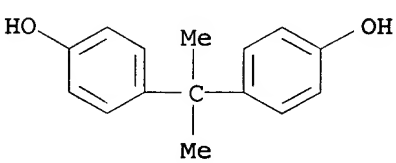
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 26 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:182065 HCAPLUS
DN 132:309149
TI New directions in polymer-**clay nanocomposite** formation
AU Wang, Zhen; Pinnavaia, Thomas J.
CS Department of Chemistry, The Center for Fundamental Materials Research, Michigan State University, East Lansing, MI, 48824, USA
SO Polymeric Materials Science and Engineering (2000), 82, 274-275
CODEN: PMSEDG; ISSN: 0743-0515
PB American Chemical Society
DT Journal
LA English
AB A series of **exfoliated** epoxy resin-layered silicic acid **nanocomposites** were obtained using the **organoclay**

technique. The high optical transparency of the **nanocomposites**, together with their anticipated barrier film properties make them attractive for packaging materials and protective films.

CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38

ST **exfoliated** epoxy resin layered **silicate nanocomposite**; optical transparency **nanocomposite**; barrier film packaging **nanocomposite**

IT **Nanocomposites**
Transparent films
(**exfoliated** epoxy resin-layered silicic acid **nanocomposites**)

IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**exfoliated** epoxy resin-layered silicic acid **nanocomposites**)

IT Packaging materials
(films, gas-impermeable; **exfoliated** epoxy resin-layered silicic acid **nanocomposites**)

IT Transparency
(of **exfoliated** epoxy resin-layered silicic acid **nanocomposites**)

IT 12285-88-0, Magadiite 12285-95-9, Kenyaite 116517-18-1, Ilerite
RL: MOA (Modifier or additive use); USES (Uses)
(**exfoliated** epoxy resin-layered silicic acid **nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**exfoliated** epoxy resin-layered silicic acid **nanocomposites**)

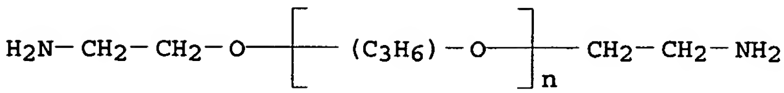
IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**exfoliated** epoxy resin-layered silicic acid **nanocomposites**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

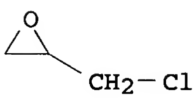
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

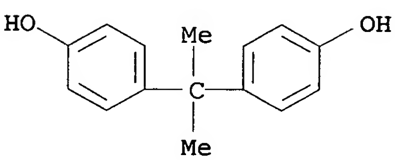
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



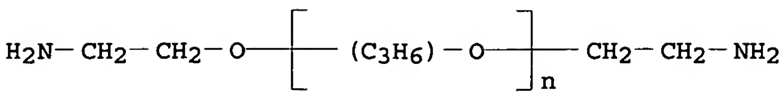
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 27 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:182045 HCAPLUS
DN 132:309147
TI Epoxy-POSS and Epoxy-**Clay nanocomposites**: thermal and viscoelastic comparisons
AU Lee, Andre; Lichtenhan, Joseph D.; Reinerth, William A., Sr.
CS Department of Materials Science and Mechanics, Michigan State University, East Lansing, MI, 48824, USA
SO Polymeric Materials Science and Engineering (2000), 82, 235-236
CODEN: PMSEDG; ISSN: 0743-0515
PB American Chemical Society
DT Journal
LA English
AB Thermal and viscoelastic performance and phys. aging behavior is compared for cured epoxy networks contg. either a monofunctional polyhedral oligomeric silsesquioxane (POSS)-epoxide or **exfoliated clay** reinforcement.

CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38
ST silsesquioxane polyhedral montmorillonite reinforced epoxy viscoelasticity
IT Stress relaxation
(thermal and viscoelastic comparison of epoxy resins reinforced with polyhedral oligomeric silsesquioxane or modified montmorillonite)
IT Epoxy resins, properties
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)
(thermal and viscoelastic comparison of epoxy resins reinforced with polyhedral oligomeric silsesquioxane or modified montmorillonite)
IT 1318-93-0, Montmorillonite, uses
RL: MOA (Modifier or additive use); USES (Uses)
(organoion-exchanged; thermal and viscoelastic comparison of epoxy resins reinforced with polyhedral oligomeric silsesquioxane or modified montmorillonite)
IT 209913-35-9
RL: MOA (Modifier or additive use); USES (Uses)
(thermal and viscoelastic comparison of epoxy resins reinforced with polyhedral oligomeric silsesquioxane or modified montmorillonite)
IT **254964-23-3**
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)
(thermal and viscoelastic comparison of epoxy resins reinforced with polyhedral oligomeric silsesquioxane or modified montmorillonite)
IT **254964-23-3**
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)
(thermal and viscoelastic comparison of epoxy resins reinforced with polyhedral oligomeric silsesquioxane or modified montmorillonite)
RN 254964-23-3 HCAPLUS
CN Oxirane, 2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and 2,2'-[1,4-butanediylbis(oxymethylene)]bis[oxirane] (9CI) (CA INDEX NAME)

CM 1

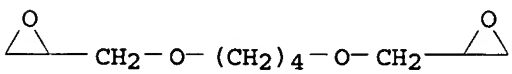
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

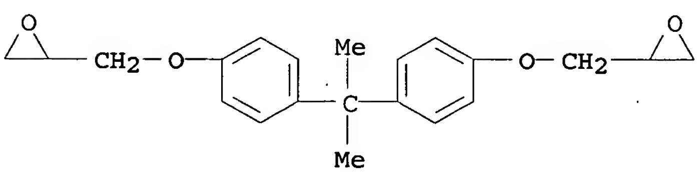
CM 2

CRN 2425-79-8
CMF C10 H18 O4



CM 3

CRN 1675-54-3
CMF C21 H24 O4



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

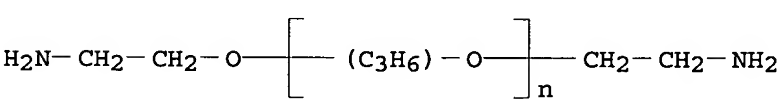
L10 ANSWER 28 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1999:528553 HCAPLUS
DN 132:138178
TI Synthesis of epoxy-**clay nanocomposites**
AU Kornmann, X.; Lindberg, H.; Berglund, L. A.
CS Division of Polymer Engineering, Lulea University of Technology, Lulea, SE-97187, Swed.
SO Annual Technical Conference - Society of Plastics Engineers (1999), 57th(Vol. 2), 1623-1627
CODEN: ACPED4; ISSN: 0272-5223
PB Society of Plastics Engineers
DT Journal
LA English
AB Epoxy-**clay nanocomposites** have been synthesized by swelling an organo treated **clay** in a diglycidyl ether of bisphenol A resin (DGEBA) with subsequent polymn. using different

curing agents. The resultant **nanostructure** was shown to
depend on the reactivity of the curing agent but also on the cation
exchange capacity of the **clay.** Characterization of the
different **nanostructures** was performed by x-ray
diffraction and transmission electron microscopy.

CC 37-6 (Plastics Manufacture and Processing)
ST epoxy **clay nanocomposite** synthesis
IT **Nanocomposites**
(synthesis of epoxy-**clay nanocomposites**)
IT Epoxy resins, properties
Intercalation compounds
RL: PRP (Properties)
(synthesis of epoxy-**clay nanocomposites**)
IT 1318-93-0, Montmorillonite, uses 25068-38-6, Epon 828
38294-67-6, Amicure PACM-bisphenol A-epichlorohydrin copolymer
68318-44-5, Bisphenol A-epichlorohydrin-Jeffamine D 230
copolymer 116802-94-9, Bisphenol A-epichlorohydrin-3,3'-Dimethyl-
4,4'-diaminodicyclohexylmethane copolymer
RL: TEM (Technical or engineered material use); USES (Uses)
(synthesis of epoxy-**clay nanocomposites**)
IT **68318-44-5**, Bisphenol A-epichlorohydrin-Jeffamine D 230
copolymer
RL: TEM (Technical or engineered material use); USES (Uses)
(synthesis of epoxy-**clay nanocomposites**)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with
α-(2-aminomethylethyl)-ω-(2-
aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

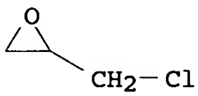
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

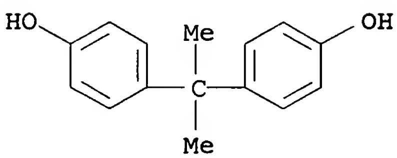
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 29 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1999:90329 HCAPLUS
DN 130:140083
TI Polymer **clay intercalate**, its manufacture and polymer compositions for **nanocomposites**
IN Pinnavaia, Thomas J.; Shi, Heng-zhen; Lan, Tie
PA Board of Trustees Operating Michigan State University, USA
SO U.S., 24 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5866645	A	19990202	US 1996-749149	19961114
	US 5993769	A	19991130	US 1998-79060	19980514

PRAI US 1996-749149 A1 19961114
AB Homostructured, cation-exchanged, layered **clay** compns. contg. mixed onium and alkali metal, alk. earth metal, protonated hydronium ions and mixts. are used to produce polymer **clay** composites. Particulate concs. are formed by **intercalation** of a polymer component into the galleries of the layered inorg./org. homostructured layered cation exchange compn. in a mole ratio of onium ions/inorg. ions 10-90:10-90. The layered inorg. compn. is selected from the family of 2:1 layered **silicate** clays such as smectite clays. Thus, amine-cured Epon 828 composite was formed with octylammonium/sodium-exchanged Hectabrite AW **clay** (30-70% onium levels).

IC ICM C08K003-34
INCL 524443000
CC 37-6 (Plastics Manufacture and Processing)
ST polymer **silicate clay** composite; org inorg cation exchanged **clay**; hectabrite mixed cation exchanged; tensile reinforcement epoxy **clay** composite
IT **Nanocomposites**
(polymer **clay intercalate/exfoliate** manuf. and polymer compns. for **nanocomposites**)
IT Alkyd resins
Aminoplasts
Epoxy resins, uses
Phenolic resins, uses
Polyamides, uses
Polyesters, uses
Polyimides, uses
Polyolefins
Polyoxyalkylenes, uses
Polysiloxanes, uses
Polysulfides
Polyureas
Polyurethanes, uses
Proteins, general, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polymer **clay intercalate/exfoliate** manuf. for **nanocomposites** with good reinforcing property at lower onium concn.)
IT Clays, properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(smectitic, alkylammonium/sodium-exchanged; polymer **clay intercalate/exfoliate** manuf. for **nanocomposites** with good reinforcing property at lower onium concn.)
IT Plastics, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(thermosetting; polymer **clay intercalate/ exfoliate** manuf. for **nanocomposites** with good reinforcing property at lower onium concn.)
IT 1318-93-0, Montmorillonite, properties 12173-47-6, Hectabrite AW
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(octylammonium/sodium-exchanged; polymer **clay intercalate/exfoliate** manuf. for **nanocomposites** with good reinforcing property at lower onium concn.)
IT **68318-44-5P**, Bisphenol A-epichlorohydrin-Jeffamine D 2000 copolymer
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymer **clay intercalate/exfoliate** manuf. for **nanocomposites** with good reinforcing property at lower onium concn.)
IT 9003-08-1, Melamine-formaldehyde resin 9003-35-4, Phenol-formaldehyde resin 9004-34-6, Cellulose, uses 9011-05-6, Urea-formaldehyde resin 24980-41-4, Polycaprolactone 25038-54-4,

Poly[imino(1-oxo-1,6-hexanediyl)], uses 25248-42-4,
Polycaprolactone 25322-68-3 26023-30-3, Poly[oxy(1-methyl-2-oxo-1,2-ethanediyl)] 26680-10-4, Polylactide
RL: TEM (Technical or engineered material use); USES (Uses)
(polymer **clay intercalate/exfoliate** manuf. for **nanocomposites** with good reinforcing property at lower onium concn.)

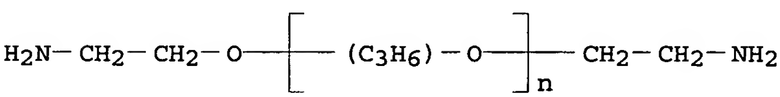
IT **68318-44-5P**, Bisphenol A-epichlorohydrin-Jeffamine D 2000 copolymer
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymer **clay intercalate/exfoliate** manuf. for **nanocomposites** with good reinforcing property at lower onium concn.)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

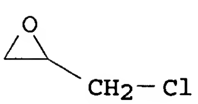
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

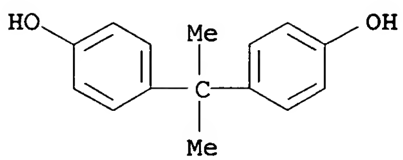
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 30 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1999:21599 HCAPLUS
DN 130:96341
TI Hybrid **nanocomposites** comprising layered inorganic material and their preparation using particulate crosslinker composition
IN Pinnavaia, Thomas J.; Lan, Tie
PA Claytec, Inc., USA
SO U.S., 17 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5853886	A	19981229	US 1996-665518	19960617
	US 6017632	A	20000125	US 1998-137518	19980820
	US 6096803	A	20000801	US 1998-136939	19980820
PRAI	US 1996-665518	A3	19960617		

AB The particulate conc. compns. are formed by **intercalation** of a polymer polymg. component (e.g. crosslinker, reactive component, catalyst and having a basic group) into the galleries of a layered inorg. cation exchange compn.. (initially in proton-exchanged form such as a 2:1 layered **silicate** cation exchangers) for the prepn. of cured polymer-inorg. **nanolayer** hybrid composites. A polymer precursor, a mixt. of polymer precursors, or a polymer melt is introduced into the galleries of the inorg. cation exchanger and reacts with the polymer polymg. component to form a cured polymer-inorg. **nanolayer** hybrid composite. Powd. Jeffamine D-2000 curing agent (precursor)-H+ -montmorillonite conc. (basal spacing 46 Å) was used to prep. epoxy polymer-**exfoliated silicate nanocomposite.**
IC ICM B32B005-16
ICS C08K009-00
INCL 428403000
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38

ST polyetheramine **silicate intercalate** powd conc;
epoxy resin **clay nanocomposite**; proton exchanged
clay polyetheramine **intercalate**;
exfoliated clay epoxy **nanocomposite**;
mech property **clay** epoxy **nanocomposite**; solvent
resistance **clay** epoxy **nanocomposite**;
adhesiveness **clay** epoxy **nanocomposite**

IT Epoxy resins, preparation
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(also as epoxy **clay** powder conc.; **nanocomposite** prepd. using powd. layered **silicate**/crosslinker conc.)

IT **Nanocomposites**
(comprising powd. layered **silicate**/crosslinker conc.)

IT Alkyd resins
Aminoplasts
Phenolic resins, uses
Polyamides, uses
Polyesters, uses
Polyimides, uses
Polyolefins
Polyoxyalkylenes, uses
Polyoxymethylenes, uses
Polysiloxanes, uses
Polysulfides
Polyureas
Polyurethanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**nanocomposite** prepd. using powd. layered **silicate**/crosslinker conc.)

IT Clays, properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(smectitic; comprising powd. layered **silicate** /crosslinker conc. for **nanocomposite**)

IT Plastics, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(thermosetting; **nanocomposite** prepd. using powd. layered **silicate**/crosslinker conc.)

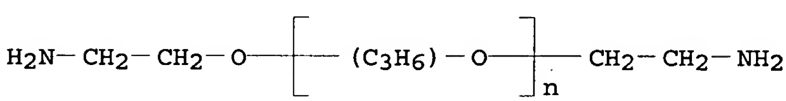
IT 68003-11-2P, Bisphenol A-epichlorohydrin-Versamid 125 copolymer
68311-01-3P, Bisphenol A-epichlorohydrin-Versamid 140 copolymer
68318-44-5P, Bisphenol A-epichlorohydrin-Jeffamine D 2000 copolymer **111307-30-3P** **122673-79-4P**, Bisphenol A-epichlorohydrin-Jeffamine T 3000 copolymer
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**nanocomposite** prepd. using powd. layered **silicate**/crosslinker conc.)

IT 9003-08-1, Formaldehyde-melamine copolymer 9003-35-4, Formaldehyde-phenol copolymer 9011-05-6, Formaldehyde-urea copolymer 24980-41-4, Polycaprolactone 25038-54-4, Poly[imino(1-oxo-1,6-hexanediyl)], uses 25248-42-4, Polycaprolactone 25322-68-3 26023-30-3, Poly[oxy(1-methyl-2-oxo-1,2-ethanediyl)] 26680-10-4, Polylactide
RL: TEM (Technical or engineered material use); USES (Uses)
(**nanocomposite** prepd. using powd. layered

silicate/crosslinker conc.)
IT 1318-00-9, Vermiculite 1318-93-0, Montmorillonite, properties
12173-47-6, Fluorohectorite 12174-40-2, Rectorite 106495-23-2,
Hydroxylhectorite ((Mg2.67Li0.33)Si4Na0.33[(OH)0.5-1F0-0.5]2O10)
RL: PRP (Properties); TEM (Technical or engineered material use);
USES (Uses)
(proton-exchanged; comprising powd. layered **silicate**
/crosslinker conc. for **nanocomposite**)
IT **68318-44-5P**, Bisphenol A-epichlorohydrin-Jeffamine D 2000
copolymer **111307-30-3P** **122673-79-4P**, Bisphenol
A-epichlorohydrin-Jeffamine T 3000 copolymer
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical
or engineered material use); PREP (Preparation); USES (Uses)
(**nanocomposite** prepd. using powd. layered
silicate/crosslinker conc.)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with
α-(2-aminomethylethyl)-ω-(2-
aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

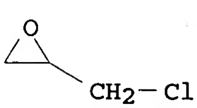
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

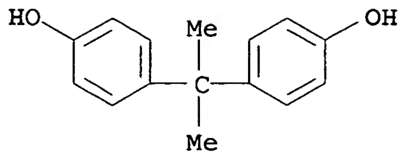
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2

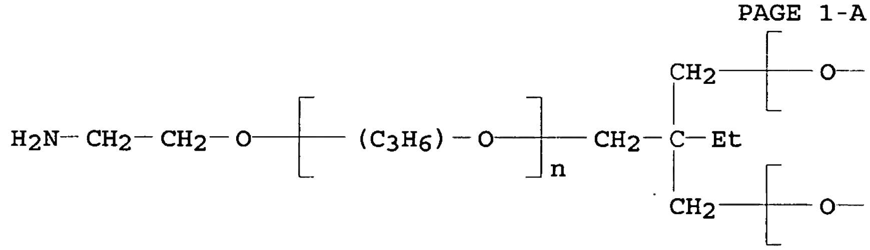


RN 111307-30-3 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane and α-hydro-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol (3:1) (9CI) (CA INDEX NAME)

CM 1

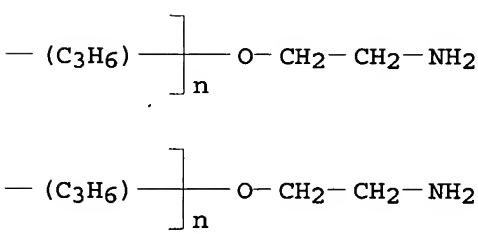
CRN 39423-51-3
CMF (C3 H6 O)n (C3 H6 O)n (C3 H6 O)n C15 H35 N3 O3
CCI IDS, PMS

PAGE 1-A



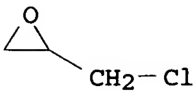
3 (D1—Me)

PAGE 1-B



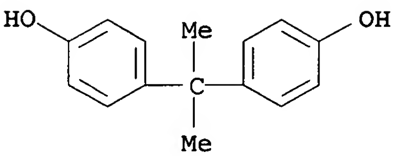
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2

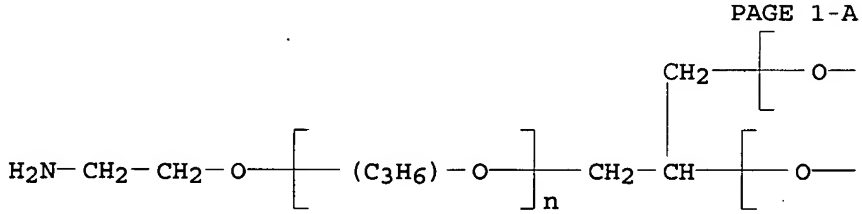


RN 122673-79-4 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane and α,α',α''-1,2,3-propanetriyltris[ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)]] (9CI) (CA INDEX NAME)

CM 1

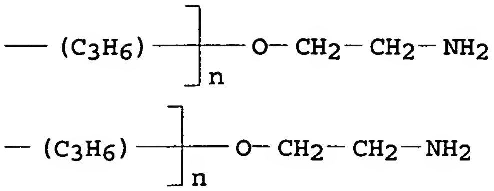
CRN 64852-22-8
CMF (C3 H6 O)n (C3 H6 O)n (C3 H6 O)n C12 H29 N3 O3
CCI IDS, PMS

PAGE 1-A



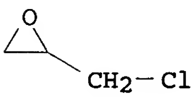
3 (D1—Me)

PAGE 1-B



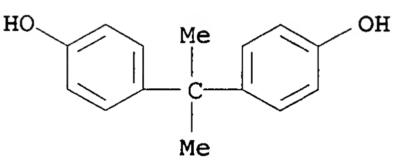
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 31 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1998:588346 HCAPLUS
DN 129:276771
TI **Clay nanolayer** reinforcement of a glassy epoxy polymer
AU Massam, Jarrod; Pinnavaia, Thomas J.
CS Department of Chemistry and Center for Fundamental Materials Research, Michigan State University, East Lansing, MI, 48824, USA
SO Materials Research Society Symposium Proceedings (1998), 520(Nanostructured Powders and Their Industrial Applications), 223-232
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
AB Glassy epoxy-**clay nanocomposites** (Tg ≈

82 °C) have been prepd. by the reaction of diglycidyl ether of bisphenol A and a polyoxyalkylene amine curing agent in the presence of organo cation exchanged smectite (montmorillonite) clays. Com. available AMS and CWC montmorillonite purified on the industrial scale afforded **nanocomposites** with performance properties comparable to those obtained from montmorillonite purified by lab. methods. We provide the first evidence for **clay nanolayer** reinforcement of a glassy epoxy matrix under compressive strain. Compression stress-strain expts. revealed substantial improvements in the modulus and yield strength when the **clay nanolayers** were **exfoliated** in the glassy matrix. However, no improvement in the modulus or yield strength was obsd. when the **clay** component was merely **intercalated** by the epoxy matrix, signifying that **nanolayer exfoliation** is an essential feature of reinforcement. Furthermore, the mech. properties of epoxy-**clay nanocomposites** prepd. with the C18H37NH3+-exchanged forms of the AMS and CWC clays were tested by dynamic mech. anal. and thermal mech. anal. The **nanocomposites** exhibit improved dynamic storage modulus above and below the glass transition temp., as well as lower coeffs. of thermal expansivity compared to the pure polymer. In addn., the solvent resistant properties of the **nanocomposites** are substantially improved compared to the pristine polymer.

CC 37-3 (Plastics Manufacture and Processing)

ST **clay** epoxy **nanocomposite** prepn property; glass temp **clay** epoxy **nanocomposite**; stress strain **clay** epoxy **nanocomposite**; thermal expansion **clay** epoxy **nanocomposite**

IT Clays, uses
RL: MOA (Modifier or additive use); USES (Uses)
(montmorillonitic; prepn. and properties of **clay** -reinforced epoxy **nanocomposites**)

IT **Nanocomposites**
Thermal expansion
Yield strength
(prepn. and properties of **clay**-reinforced epoxy **nanocomposites**)

IT Clays, uses
RL: MOA (Modifier or additive use); USES (Uses)
(prepn. and properties of **clay**-reinforced epoxy **nanocomposites**)

IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(prepn. and properties of **clay**-reinforced epoxy **nanocomposites**)

IT 57-09-0, Cetyltrimethylammonium bromide
RL: NUU (Other use, unclassified); USES (Uses)
(**clay** ion exchanged with; prepn. and properties of **clay**-reinforced epoxy **nanocomposites**)

IT **68318-44-5**, Epon 826-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(prepn. and properties of **clay**-reinforced epoxy **nanocomposites**)

IT **68318-44-5**, Epon 826-Jeffamine D230 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)

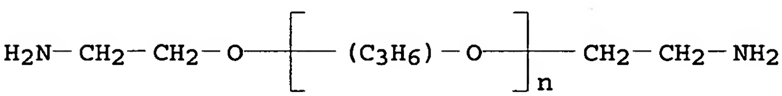
(prepn. and properties of **clay**-reinforced epoxy **nanocomposites**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

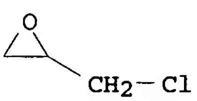
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

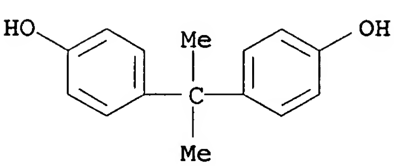
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 32 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1998:411064 HCAPLUS
DN 129:68321

TI Hybrid Organic-Inorganic **Nanocomposites**:
Exfoliation of Magadiite **Nanolayers** in an
Elastomeric Epoxy Polymer

AU Wang, Zhen; Pinnavaia, Thomas J.
CS Department of Chemistry and Center for Fundamental Materials
Research, Michigan State University, East Lansing, MI, 48824, USA

SO Chemistry of Materials (1998), 10(7), 1820-1826
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English

AB A newly developed class of paraffin-like organomagadiite **intercalates**, interlayered by primary, secondary, tertiary, and quaternary onium ions, has been used to form elastomeric polymer-layered **silicate nanocomposites** by in situ polymn. during the thermoset process. Depending on the nature of the onium ions, **intercalated** or **exfoliated** magadiite **nanocomposites** were obtained. The **exfoliated nanocomposites** were typically disordered, but a new type of **exfoliated** structure also was obsd. in which the **nanolayers** were regularly spaced over long distances (e.g., .apprx.80 Å Bragg spacings). The tensile properties of the polymer matrix were improved greatly by the reinforcement effect of the **silicate nanolayers**. **Exfoliated silicate nanolayers** were more effective than **intercalated** assemblies of **nanolayers** in optimizing reinforcement. Interestingly, organomagadiite **exfoliation** in the rubbery epoxy matrix improves the elongation-at-break while improving tensile strength, which is opposite to the behavior of conventional composites. The improvement in tensile properties provided by **exfoliated** magadiite **nanolayers** was not quite as good as that afforded by **exfoliated** smectite clays, particularly with regard to tensile modulus at higher loadings.

CC 37-5 (Plastics Manufacture and Processing)

ST **exfoliation** magadiite **nanolayer** epoxy resin **nanocomposite**; alkylammonium exchanged magadiite epoxy **nanocomposite**; tensile strength magadiite epoxy **nanocomposite**

IT **Nanocomposites**
Tensile strength
(**exfoliation** of magadiite **nanolayers** in elastomeric epoxy polymer)

IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**exfoliation** of magadiite **nanolayers** in elastomeric epoxy polymer)

IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**exfoliation** of magadiite **nanolayers** in elastomeric epoxy polymer)

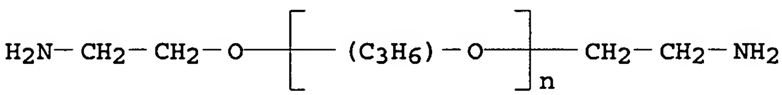
IT 12285-88-0, Magadiite
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(quaternary alkylammonium-exchanged; **exfoliation** of magadiite **nanolayers** in elastomeric epoxy polymer)

IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(**exfoliation** of magadiite **nanolayers** in
elastomeric epoxy polymer)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with
α-(2-aminomethylethyl)-ω-(2-
aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

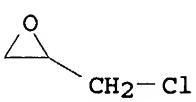
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

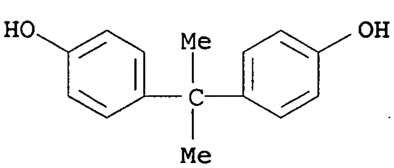
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 35 THERE ARE 35 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 33 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1998:392154 HCAPLUS

DN 129:41834
TI Sealants of epoxy resin-**clay** composites
IN Pinnavaia, Thomas J.; Lan, Tie
PA Board of Trustees Operating Michigan State University, USA
SO U.S., 16 pp., Division of U. S. Ser. No. 498,350.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

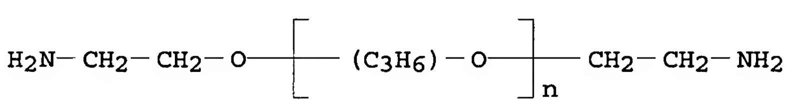
	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5760106	A	19980602	US 1996-713920	19960913
	US 5801216	A	19980901	US 1997-888424	19970707
PRAI	US 1995-498350	A3	19950705		

AB A **clay**-cured epoxy resin compn., useful for seals and other thin layer applications, with the cured epoxy resin in the **clay** by **intercalation** or **exfoliation** gives a composite which can have superior tensile strength and/or solvent resistance compared to the cured epoxy resin without the **clay** or with the **clay** but without the **intercalation** or **exfoliation.** The preferred epoxy resins are flexible and usually elastic because of the epoxy resin and/or curing agent which is used. Thus, Epon 828 and Jeffamine D 2000 crosslinker were **intercalated** to C4-18alkylammonium exchanged montmorillonite **clay** to give composites having tensile strength 1.3-3.6 MPa and modulus 8.1-14.5 MPa.
IC ICM C08K003-34
ICS C08K009-04; C08L003-00
INCL 523209000
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38, 42
ST epoxy resin **clay** composite seal; **exfoliated clay** epoxy **nanocomposite**; **intercalated clay** epoxy **nanocomposite**; alkylammonium exchanged **clay** epoxy composite
IT **Nanocomposites**
(alkylammonium chain length effect on property; epoxy resin-**exfoliated** or **intercalated clay** composites with good phys. properties for sealants)
IT Sealing compositions
(epoxy resin-**exfoliated** or **intercalated clay** composites with good phys. properties for sealants)
IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(epoxy resin-**exfoliated** or **intercalated clay** composites with good phys. properties for sealants)
IT Clays, properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(smectitic; epoxy resin-**exfoliated** or

intercalated clay composites with good phys.
properties for sealants)
IT 208342-68-1, Bisphenol F diglydicyl ether-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); TEM (Technical or engineered
material use); USES (Uses)
(epoxy resin-**exfoliated** or **intercalated**
clay composites with good phys. properties for sealants)
IT 1318-93-0, Montmorillonite, properties 12173-47-6, Hectorite
12174-40-2, Rectorite **68318-44-5**, Epon 828-Jeffamine D
2000 copolymer 113891-24-0, Lithium magnesium fluoride
silicate (Li3.2Mg4.4F4(Si2O5)4)
RL: PRP (Properties); TEM (Technical or engineered material use);
USES (Uses)
(epoxy resin-**exfoliated** or **intercalated**
clay composites with good phys. properties for sealants)
IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: PRP (Properties); TEM (Technical or engineered material use);
USES (Uses)
(epoxy resin-**exfoliated** or **intercalated**
clay composites with good phys. properties for sealants)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with
α-(2-aminomethylethyl)-ω-(2-
aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and
(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

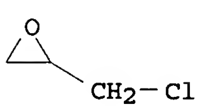
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

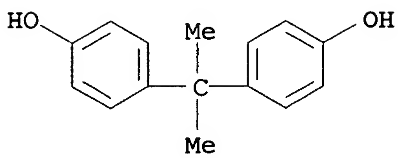
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



RE.CNT 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 34 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1998:388345 HCAPLUS
DN 129:68595
TI **Intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepared with the **intercalates**
IN Lan, Tie; Beall, Gary W.; Tsipursky, Semeon
PA Amcol International Corp., USA
SO Eur. Pat. Appl., 42 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 7

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 846661	A2	19980610	EP 1997-308842	19971104
	EP 846661	A3	19990728		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	US 6057396	A	20000502	US 1997-907950	19970811
PRAI	US 1996-758740	A	19961206		
	US 1997-907950	A	19970811		

AB **Intercalates** are formed by contacting a layered material, e.g., a **phyllosilicate**, with an intercalant monomer surface modifier including an alkyl radical having ≥6 C atoms to sorb or **intercalate** the intercalant monomer, oligomer or polymer between adjacent platelets of the layered material. Sufficient intercalant monomer surface modifier is sorbed between adjacent platelets to expand the adjacent platelets to a spacing of .gtorsim.10 Å (as measured after H2O removal to a max. of 5% by wt. H2O), and preferably .gtorsim.20 Å, so that the **intercalate** easily can be **exfoliated** into individual platelets. The co-presence of the intercalant monomer surface modifier and polymerizable monomer, oligomer or polymer provide an environment for more polymerizable monomers, oligomers or

polymers to be **intercalated** into the interlayer spacing and the **intercalates** are readily **exfoliated** into polymer matrixes to form **nanocomposites.** Thus, an intercalant of dodecyl pyrrolidone/DER 331/Na montmorillonite **clay** (1:3:2.25) was compounded (10 parts) with 90 parts DER 331 matrix resin to give a conc. for **nanocomposite** manuf.

IC ICM C01B033-44
ICS C09C001-42; C09C003-10; C08K007-00; C08K003-34

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 37, 49

ST epoxy resin sorption **clay intercalate**; dodecyl pyrrolidone sodium montmorillonite **intercalate**; bisphenol A epoxy composite **clay intercalate**; layered **clay** alkylated modifier **intercalate**

IT **Exfoliation**
Nanocomposites
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT Polyesters, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT Epoxy resins, uses
Polyamides, uses
Polycarbonates, uses
Polysiloxanes, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT **Intercalation** compounds
Phyllosilicate minerals
RL: TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT Clays, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(smectitic; **clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT Bentonite, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(sodian; **clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT Plastics, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(thermoplastics; **clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT Plastics, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(thermosetting; **clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT 24968-12-5, Poly(butylene terephthalate) 26062-94-2, Poly(butylene terephthalate)
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT 959-26-2D, Bis(2-hydroxyethyl terephthalate), polymers 3645-00-9D, 2-Hydroxyethyl methyl terephthalate, polymers 9002-89-5, Poly(vinyl alcohol) 9003-39-8, Poly(vinylpyrrolidone) 9016-00-6, Poly(dimethylsiloxane) 23358-95-4D, Bis(4-hydroxybutyl terephthalate), polymers 25038-59-9, Poly(ethylene terephthalate), uses 25068-38-6, DER 331 26336-38-9, Poly(vinylamine) 31900-57-9, Poly(dimethylsiloxane) 73214-83-2D, Hydroxybutyl methyl terephthalate, polymers 96141-20-7, DER 354
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT **68318-44-5** 209063-75-2 209063-76-3, Bisphenol A-epichlorohydrin-Epicure 3055 copolymer
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT 1318-93-0, Sodium montmorillonite, uses 7425-87-8,

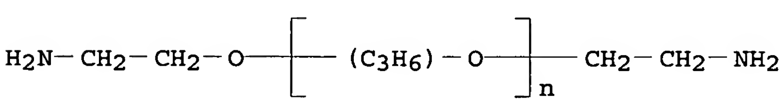
N-Octadecyl-2-pyrrolidone
RL: TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

IT **68318-44-5**
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**clay intercalates** and **exfoliates** formed by co-**intercalation** of monomer, oligomer or polymer intercalants and surface modifier intercalants and layered materials and **nanocomposites** prepd. with **intercalates**)

RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

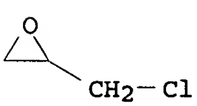
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

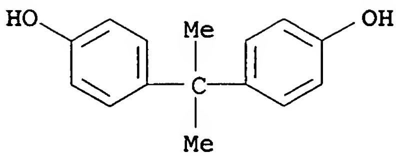
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



L10 ANSWER 35 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1996:452478 HCAPLUS
DN 125:144060
TI Interfacial Effects on the Reinforcement Properties of Polymer-**Organoclay Nanocomposites**
AU Shi, Hengzhen; Lan, Tie; Pinnavaia, Thomas J.
CS Department of Chemistry, Michigan State University, East Lansing, MI, 48824, USA
SO Chemistry of Materials (1996), 8(8), 1584-1587
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English
AB Epoxide-**exfoliated clay nanocomposites** have been formed from alkylammonium ion exchanged forms of smectite **clay** (montmorillonite) with alkyl chain lengths as short as three carbons atoms. This advancement in the **intercalation** chem. of **nanocomposite** formation, which was made possible by avoiding the gallery "pinning" effect of small quantities of Na+ ions, has allowed us to examine the relative importance of various interfacial factors contributing to **nanolayer** reinforcement. The enhancement in tensile properties with decreasing alkylammonium ion chain length signifies that binding interactions of the polymer to the siloxane basal surfaces are most important. Substantial contributions from van der Waals interactions between the polymer and the alkyl chains of the onium ions are precluded, because the tensile properties do not improve with increasing chain length. Although smectite clays would be good reinforcement agents for epoxy matrixes even in the absence of alkylammonium exchange cations, the onium ions are needed to thermodynamically favor loading of the galleries with polymer precursors and to kinetically promote by acid catalysis the intragallery polymn. process.
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38
ST **exfoliated** montmorillonite epoxy **nanocomposite** interface reinforcement; **intercalated** montmorillonite epoxy **nanocomposite** interface reinforcement; alkylammonium exchanged montmorillonite epoxy composite **exfoliation**
IT Interface
(interfacial effects on the reinforcement properties of **exfoliated** polymer-**organoclay nanocomposites**)
IT **Exfoliation**
(interfacial effects on the reinforcement properties of polymer-**organoclay nanocomposites**)
IT Epoxy resins, properties
RL: PEP (Physical, engineering or chemical process); POF (Polymer in

formulation); PRP (Properties); PROC (Process); USES (Uses)
(interfacial effects on the reinforcement properties of polymer-**organoclay nanocomposites**)

IT 1318-93-0, Montmorillonite, uses
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(alkylammonium ion-exchanged; interfacial effects on the reinforcement properties of polymer-**organoclay nanocomposites**)

IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)
(interfacial effects on the reinforcement properties of polymer-**organoclay nanocomposites**)

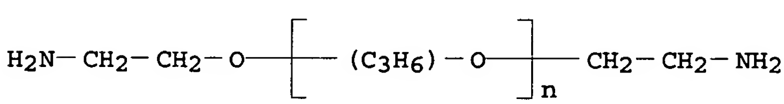
IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)
(interfacial effects on the reinforcement properties of polymer-**organoclay nanocomposites**)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

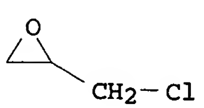
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1— Me)

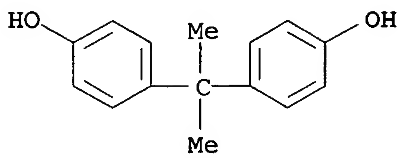
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



L10 ANSWER 36 OF 37 HCAPLUS
AN 1996:1078 HCAPLUS
DN 124:118910
TI **Clay**-epoxy **nanocomposites**: Relationships between reinforcement properties and the extent of **clay** layer **exfoliation**
AU Lan, Tie; Wang, Zhen; Shi, Hengzhen; Pinnavaia, Thomas J.
CS Center Fundamental Materials Research, Michigan State University, East Lansing, MI, 48824, USA
SO Polymeric Materials Science and Engineering (1995), 73, 296-7
CODEN: PMSEDG; ISSN: 0743-0515
PB American Chemical Society
DT Journal
LA English
AB Short chain alkylammonium (e.g., octylammonium)-exchanged montmorillonite clays were **exfoliated** into an Epon 828-Jeffamine D2000 epoxy matrix via a hot-mold-casting method in which the Epon 8282-Jeffamine mixt. and **intercalated** montmorillonite were cast into a preheated 125° mold and cured for 6 h. Heat-induced monomer **intercalation** was the key factor in forming **exfoliated clay** composites. The short chain alkylammonium-exchanged **clay** is preferred as reinforcing agent if an **exfoliated** **nanocomposite** can be obtained. The properties of the composite are discussed briefly with respect to **exfoliation**
.
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38
ST **clay** epoxy **nanocomposite** prepn; **exfoliation** montmorillonite epoxy composite; hot mold casting **clay** epoxy **nanocomposite**
IT Epoxy resins, properties
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(crosslinked; prepn. and characterization of **exfoliated** **clay**-epoxy composites in relation to hot-mold casting and crosslinking)
IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(crosslinked; prepn. and characterization of **exfoliated** **clay**-epoxy composites in relation to hot-mold casting and crosslinking)
IT 1318-93-0D, Montmorillonite, octylammonium **intercalated**
20492-69-7D, Octylammonium, montmorillonite **intercalation** compds.

RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**exfoliated**; prepn. and characterization of **clay**-epoxy composites in relation to hot-mold casting and crosslinking)

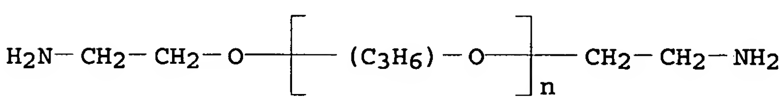
IT **68318-44-5**, Epon 828-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(crosslinked; prepn. and characterization of **exfoliated** **clay**-epoxy composites in relation to hot-mold casting and crosslinking)

RN 68318-44-5 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and (chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

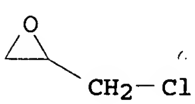
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1—Me)

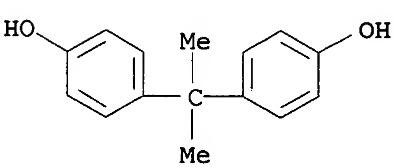
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2

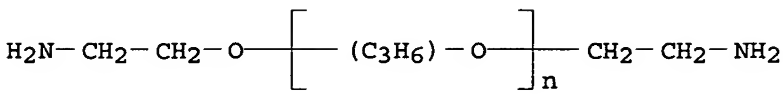


L10 ANSWER 37 OF 37 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1994:681846 HCAPLUS
DN 121:281846
TI **Clay**-Reinforced Epoxy **Nanocomposites**
AU Lan, Tie; Pinnavaia, Thomas J.
CS Department of Chemistry, Michigan State University, East Lansing, MI, 48824, USA
SO Chemistry of Materials (1994), 6(12), 2216-19
CODEN: CMATEX; ISSN: 0897-4756
DT Journal
LA English
AB New epoxy-**clay nanocomposites** with sub-ambient glass transition temps. have been prepd. by the reaction of epoxy resin and a polyetheramine curing agent in the presence of alkylammonium ion-exchanged forms of montmorillonite clays. Owing to the expansion of the **clay** galleries upon polymer network formation, the cured composites contain **nanoscopic clay** plates dispersed in a rubbery polymer matrix. Both the tensile strength and the modulus of the polymer-**clay nanocomposite** increased with increasing **clay** content. The reinforcement provided by the 10 Å-thick **silicate** layers at 15 wt% (.apprx.7.5 vol%) loading was manifested by a more than ten-fold improvement in tensile strength and modulus. The rubbery state of the polymer matrix above Tg may allow alignment of the **exfoliated silicate** layers upon applying strain, thereby enhancing reinforcement.
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38
ST montmorillonite reinforcement epoxy **nanocomposite** mech property
IT Epoxy resins, preparation
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. and properties of modified montmorillonite-reinforced epoxy **nanocomposites**)
IT 1318-93-0D, Montmorillonite, reaction products with alkylammonium halides
RL: MOA (Modifier or additive use); USES (Uses)
(prepn. and properties of modified montmorillonite-reinforced epoxy **nanocomposites**)
IT **68318-44-5P**, Epon 828-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. and properties of modified montmorillonite-reinforced epoxy **nanocomposites**)
IT **68318-44-5P**, Epon 828-Jeffamine D 2000 copolymer
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(prepn. and properties of modified montmorillonite-reinforced epoxy **nanocomposites**)
RN 68318-44-5 HCAPLUS
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with α-(2-aminomethylethyl)-ω-(2-aminomethylethoxy)poly[oxy(methyl-1,2-ethanediyl)] and

(chloromethyl)oxirane (9CI) (CA INDEX NAME)

CM 1

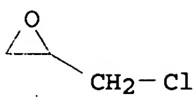
CRN 9046-10-0
CMF (C3 H6 O)n C6 H16 N2 O
CCI IDS, PMS



2 (D1— Me)

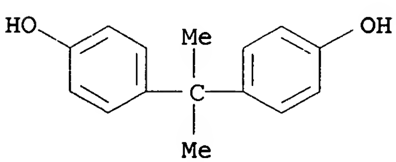
CM 2

CRN 106-89-8
CMF C3 H5 Cl O



CM 3

CRN 80-05-7
CMF C15 H16 O2



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